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PROBLEMS AND APPROACHES TO AREAWIDE WATER QUALITY MANAGEMENT

INDIANA UNIVERSITY

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to
Areawide Water Quality Management

by

School of Public and Environmental Affairs
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for the
Water Planning Division
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ABSTRACT

This report delineates some of the legal and management problems which emerged from a legal and administrative review of the implementation of §208(c)(2) and its relationship with §208(b)(2)(C) of the Federal Water Pollution Control Act of 1972 (Act). The study on which the report is based is the result of a fifteen (15) month effort that included a review and analysis of state laws in the U.S. and an assessment of a selected sample of wastewater management organizations of varying areal jurisdictions. The study consists of a main report with two appendices separately bound plus an executive summary.

The review and analysis of the laws of the fifty states focused on (a) whether the organizations empowered to manage wastewater treatment facilities currently have adequate authority to qualify for federal assistance under the Act and (b) the authority to implement the organizational arrangements and policies described in Sections V and VI of the report.

A selected group of existing management organizations were examined as a means of (a) identifying and describing problems that may emerge in establishing wastewater management agencies in accordance with the provisions of the Act, and (b) developing alternative management models capable of satisfying the performance criteria developed in this report.

The primary focus of §208(b)(2)(C) is on two innovations in wastewater management: (1) adequate authority to manage wastewater activities on an areawide basis significantly broader than those currently operating, and (2) capability and authority to undertake water quality planning and management through control over point and nonpoint pollution sources and the control of the location of wastewater treatment facilities and other discharge sources.

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SECTION I

CONCLUSIONS

This report deals with the issue of the adequate authority of designated waste treatment management agencies to perform as required by §208(c)(2) and related sections of the Federal Water Pollution Control Act Amendments of 1972 (Act). "Adequate authority" includes both the legal authority and the management capability of the agencies. From a legal analysis of the laws of the fifty states and of federal legislation, and from a survey of existing waste treatment management agencies, the study reached the following conclusions.

GENERAL CONCLUSIONS

1. Planning: A Continuing Process

In any area, effective management of water quality means integrating the planning process with such program implementation activities as design and construction, operations, and performance assessment. Planning may be a separate process, but it cannot be conducted in a vacuum -- it must have ongoing input from all other activities comprising the water quality program, and it does not end when design or construction begins. Looked at the other way round, the later stages of water quality control (such as operations, regulation, and performance assessment) should be incorporated in the planning process from the very beginning. In sum, good planning is a continuing process.

2. Planning: The Use of Existing Agencies

While the use of existing agencies to perform the required functions of the areawide plan has distinct advantages, too much fragmentation of effort over too many agencies can cause problems in securing cooperation and assessing responsibility.

3. Planning: Policy Alternatives

Under the terms of the act, planners of water quality control are not faced with just choices about physical or structural alternatives for wastewater treatment. They are required also to examine policy alternatives which will affect the quantity and quality of wastewater. For example, they may recommend alterations in building codes so that new residential waterclosets use much less water by volume; or they may consider using the price mechanism as a means of changing behavior through full cost recovery user charges.

4. Planning: Cost Effectiveness

The Act emphasizes not only examining a wider range of alternative treatment strategies but also selecting from them on a cost-effectiveness basis. This criterion is a strong indication that the intent of Congress is to urge consideration of other methods than waste treatment plants as a means of achieving water quality.

5. Planning: Land Use

Planning for the improvement of water quality is inseparable from planning for land use. The availability of water quality improvement services (whether existing or proposed) is a crucial determinant of the nature and location of land development. Conversely, the pattern of land development crucially affects the costs of managing water quality. Under the terms of the Act, therefore, planners of water quality control must develop some positive and effective relationship with planners of land use. To date, environmental and water quality considerations have little influenced the planning of land use.

6. Management: Waste Treatment Strategies

The new Act significantly increases the number of treatment strategies which are eligible for federal funds. Since 1956, the construction of more and larger treatment plants has been the main method of achieving the objectives of federal water pollution control legislation. This "end-of-pipe" philosophy ignores the advantages of many other approaches, and the Act requires that it cease to be the only method examined by planners. Examining such alternative strategies as process changes, changes in raw materials, and by-product recover and production will lead to implementing ways of affecting the quantity and quality of wastewater generated, while in-stream re-aeration and low-flow augmentation are useful in reducing the need for costly treatment facilities.

However, while such alternative strategies as process changes, materials recovery, and by-product production aimed at achieving desired levels of ambient water quality are eligible under the Act for federal assistance, these strategies must be carefully assessed to avoid such unanticipated results as public subsidies for private technological development.

7. Management: Legal Basis

At present, the laws of many states do not provide the basis for an integrated approach to water quality management as required by the Act. Recent legislation in some states, however, indicates a trend toward the required integration of activities; i.e., an areawide or regionalized approach to water quality control. In all states the present statutory basis for a waste treatment agency having "adequate authority" as required by the Act should be examined to determine whether new legislation is necessary.

8. Management: Alternative Models

Any intended organization for waste treatment management must be flexible enough to adapt to extensive variations in state law and local needs and customs. There are at least three model waste treatment management organizations - areawide, basinwide, and regionalized state - that offer the appropriate flexibility.

9. Management: The Price Mechanism

In addition to recovering treatment costs, the price mechanism can effectively bring about a reduction in wastewater discharges. In many situations it is more effective than enforcement. The price mechanism is among the alternative strategies to be considered under the terms of the Act.

10. Management: Control Issues

Problems may arise with respect to authority to control water quality because of the political boundaries of existing entities which may be designated as planning and/or management agencies. These problems will arise primarily from the limited responsibilities assigned to such agencies under present laws. Although §208(b) requires the areawide management plan to provide a process for identifying and controlling nonpoint sources of pollution, the Act does not identify or limit the methods of control which will satisfy this requirement.

11. Regulation

There is a variety of regulatory tools which are appropriate for managing water quality. Among them are: (a) land use controls; (b) permits and licensing; (c) standards; (d) pricing mechanisms; (e) persuasion; (f) traditional enforcement procedures; and (g) the purchasing power of government. The usefulness of any one or combination of these tools depends upon the particular problem area. In general, the operations of the marketplace are at least as effective as direct government intervention.

12. Performance Assessment

Government should delineate and disseminate explicit criteria for assessing the performance of planning and management entities. These criteria should evolve from a series of dialogues between assessors and performers. In an endeavor of this magnitude, success could depend on everyone knowing, understanding, and agreeing to the same set of rules before work starts. Further, everyone (including the performers) should be privy to the process of changing the rules later.

Government should also equip itself with the capability for achieving performance assessment. An apt analogy is that of money audits. The same capability for performance audits is required of government.

13. Public Participation

The Act's criteria for insuring public participation in water quality control decisions cannot be met in practice simply by appointing elected officials to policy boards. The manner in which these criteria may be defined and implemented therefore must still be carefully studied. Further, the ways in which an areawide plan may be developed to reflect local social preferences and larger interests (i.e., from beyond the local area) have yet to be identified.

14. Personnel Resources

Several states and major metropolitan governments have created enough personnel resources in planning and management to enable them to begin implementing the requirements of §208(c)(2) of the Act. However, most states and local governments lack enough trained personnel. This lack may be significantly remedied by use of planning and training grants, as well as by increased federal EPA technical assistance.

There is a particular lack in present state and local agencies of the necessary personnel and capability for performance assessment.

A vital role in determining the effectiveness of an area's management agency is the personal quality of its chief administrative officer: his experience, knowledge, administrative ability, and especially his open-mindedness.

15. Intraregional Disagreements

Regionalization or areawide planning always has the potential for creating conflicts of judgment -- honest differences of opinion -- as to the best courses to follow. These disagreements mainly concern the distribution of powers and duties from both a geographical and a functional point of view.

CONCLUSIONS ABOUT §208(c)(2)

1. §208(c)(2)(A)

Few existing management agencies established by state and local laws have adequate authority to perform all the functions required of a waste treatment management agency as set forth in §208(c)(2) and related sections of the Act. In most states, however, there are two or more agencies with jurisdiction in the same geographical area which collectively could meet the requirements of §208(c)(2); i.e., could perform one or more of the "appropriate portions" of the areawide plan. Therefore, if the areawide plan adopted pursuant to §208(b) assigns or delegates performance of such "appropriate portions" to the one or more agencies with the legal capacity and demonstrated capability to perform such within the area, the requirements of §208(c)(2)(A) can be met in these states without new or amendatory legislation.

2. §208(c)(2)(B)

In order to assess the adequate authority of waste treatment management agency (agencies) to "manage effectively waste treatment works and related facilities" as required by §204(c)(2)(B), both the legal capacity and management capability of the management agency (agencies) should be considered; therefore, such assessment cannot be made, and it cannot be determined whether the agency (agencies) meet the requirements of §208(c)(2)(B) and the requirements of §204(b)(1)(C), until the areawide plan is adopted and the functions of the agency (agencies) are set forth therein.

3. §208(c)(2)(C)

Most waste treatment management agencies have adequate authority to design, construct and operate waste treatment works as required by §208(c)(2)(C), including the broad meaning of "treatment works" as defined in §212(2). The emphasis, however, so far has been on a single option -- conventional treatment plants.

4. §208(c)(2)(D)

Most waste treatment management agencies have adequate authority to accept and utilize grants, or other funds from any source, for waste treatment management purposes as required by §208(c)(2)(D) of the Act.

5. §208(c)(2)(E)

Most waste treatment management agencies as operating agencies have adequate authority to raise revenues and assess waste treatment charges as required by §208(c)(2)(E) of the Act.

a. In many states, however, although there is the legal capacity so to charge, the existing systems of charges utilized by such agencies do not meet the additional requirements that such charges result in each category of user paying its proportionate share of the cost of operation and maintenance as required by §204(b)(1)(A).

b. In most states, however, not only do existing systems of charges fail to meet, but there is no express statutory authority to enable the agency (agencies) to meet the requirement that industrial users repay the federally funded portion of construction costs as attributed to treating industrial wastes as required by §204(b)(1)(B).

c. In addition, in large urban-industrial areas with many industries discharging into the system, the securing of firm and binding commitments from each industry to pay its share of the federal portion of construction costs as required by §204(b)(1)(B) presents substantial implementation problems. This in turn affects the implementation of §208(c)(2)(E).

6. §208(c)(2)(F)

Most waste treatment management agencies have adequate authority to incur both short- and long-term indebtedness as required by §208(c)(2)(F), although certain approval or procedures are required under state laws.

7. §208(c)(2)(G)

Under most state laws, waste treatment management agencies do not have express statutory authority to assure that each participating community (municipality) pay its proportionate share of treatment costs as required by §208(c)(2)(G) of the Act. Most states do, however, permit contracting for services by and among communities, and such contracts usually provide for sharing treatment costs.

8. §208(c)(2)(H)

One of the most prevalent problems is the inability or lack of authority of any agency within an area to comply with §208(c)(2)(H) of the Act, which requires that the waste treatment management agency have adequate authority "to refuse to receive any wastes from any municipality or subdivision thereof, which does not comply with any provisions of an approved areawide plan."

9. §208(c)(2)(I)

Most waste treatment management agencies have adequate authority to accept for treatment industrial wastes as required by §208(c)(2)(I) of the Act, and, in addition, most waste treatment management agencies have authority to establish pretreatment standards and to refuse industrial wastes which do not comply therewith or which would interfere with the operation of the treatment works.

10. §208(c)(2) - General

Where an areawide plan encompasses several municipalities or waste treatment management agencies, the noncompliance (noncooperation) with the areawide plan by one or more of the municipalities or agencies may be difficult to rectify if such noncomplying agency or community is not violating effluent or water quality standards.

CONCLUSIONS ABOUT §208(b)(2)(C)

1. §208(c)(2)(C)

Few states currently permit waste treatment management agencies to regulate the location, modification and construction of facilities, other than publicly owned treatment works, which result in any discharge of pollutants to waters in the area.

2. §208(b)(2)(C)

Most states have sufficient legislation to implement a wide variety of regulatory tools such as permits and licensing, standards, pricing mechanisms, and traditional enforcement procedures including fines and penalties.

SECTION II

RECOMMENDATIONS

GENERAL RECOMMENDATIONS

1. Planning: Strategies

The planning process should consider a wider range of alternative and complementary strategies to achieve water quality. Among these strategies should be the following:

- land use controls
- permit systems
- differentiated user charges
- prohibitions
- in-plant process changes
- by-product production
- materials recovery
- use of assimilative capacity.

2. Planning: Public Participation

Planning entities should use the provisions of the Act to ensure that all interested parties receive adequate information about alternative strategies and their consequences. The public being served, as well as the waste treatment management agencies and the policy-makers, should be kept informed.

3. Planning: Local Government Participation

Because any areawide plan will fundamentally affect development within an area, it should be formulated by local governments and their constituents. This will help both to overcome local apprehension about any loss of autonomy as a consequence of areawide management, and to facilitate adoption and implementation of the areawide plan. The plan must not merely be "announced" or "given" to a local area.

4. Planning: Policy Boards

The provisions of the Act requiring appropriate representation in areawide planning should be so implemented that elected

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representatives of local general purpose governments comprise a substantial portion of the membership of policy boards.

5. Planning: Federal Role

The rules and regulations to be promulgated by EPA should contain an explicit statement that under §201(g)(2)(A) federal assistance will be available to support a wide range of alternative strategies aimed at achieving desired levels of ambient water quality at least cost. Such activities as resource utilization charges, materials recovery, and by-product production could be eligible for federal assistance.

6. Management: User Charges

In addition to recovering the direct costs of treatment, management entities should adopt user charges to recover the costs of management activities (such as planning, monitoring, operation of facilities, administration, and technical assistance provided within the service area).

7. Management: Economic Incentives

Both EPA and areawide agencies should consider using such economic incentives as full cost recovery user charges to influence:

- point source dishcarges (public-owned facilities, industrial and commercial establishments, etc.)
- non-point source discharges (construction runoff, agricultural runoff, stormwater runoff, etc.)

8. Management: Integration with Related Activities

EPA, state agencies, and waste treatment management agencies should seek eventual integration of the management of water quality with the management of solid and gaseous residuals, at both state and local levels.

9. Management: Federal Role

Through creative administration of the provisions of §208(c)(2), EPA should encourage and strengthen the programs of existing entities -- whether local, areawide, or state -- which already have the authority to plan, design, construct, and operate facilities and to apply non-structural measures.

10. Regulation: Useful Mechanisms

The state and areawide agencies should consider a full range of regulating tools, or combinations thereof, including

(a) land use controls; (b) permits and licensing; (c) standards; (d) pricing mechanism; (e) persuasion; (f) traditional enforcement procedures; and (g) their purchasing power.

11. Performance Assessment: Federal Role

In addition to a procedural checklist, the EPA should develop and implement a performance assessment capability focusing on the ability of water quality management agencies to perform as required.

12. Performance Assessment: State Role

Each state should also develop and implement a performance assessment capability. This capability, however, should focus on evaluating the programs of regional authorities, sanitary districts, municipalities, and other intrastate operating agencies with the responsibility for improving water quality.

RECOMMENDATIONS ABOUT §208(c)(2)

1. §208(c)(2)(A)

To facilitate compliance with §208(c)(2)(A), the §208(b) areawide plan should assign or delegate implementation of "appropriate portions" of the plan to existing waste treatment management agencies that have the legal capacity and demonstrated management capability to perform such assigned portion (portions) -- provided, however, that such delegation does not result in excessive fragmentation. "Appropriate portions" has both functional and geographical implications.

2. §208(c)(2)(B)

Federal and state authorities should define the term "manage effectively" in this section so as to evaluate the capabilities of management agencies to perform, rather than focusing on the procedural aspects required to be eligible for a grant under the Act. Management agencies should be given time enough to demonstrate their ability to perform.

3. §208(c)(2)(C)

State authorities should emphasize the broader meaning of "treatment works" when enacting new legislation about a waste treatment management agency's authority to design, construct, and operate waste treatment works as required by this Section. States and management agencies should take advantage of this broader meaning when determining the type of project for which a grant will be sought.

4. §208(c)(2)(D)

Most waste treatment management agencies have adequate authority to accept and utilize grants as required by this Section. However, in cases where an intermediate agency is to receive the grants for distribution to a waste treatment management agency, the states should provide (if they have not already done so) that such federal grants can be used only for the specific pfoject for which the grant was made.

5. §208(c)(2)(E)

Although most waste treatment management agencies have authority to raise revenues and assess waste treatment charges,

a. such agencies must devise user charge systems and methods which insure that each category of user pays its proportionate share of costs so as to comply with §204(b)(1)(A). These charge systems and methods should be based on the characteristics of the user's discharge. These characteristics include volume, delivery flow rate (timing of discharge), and composition of the effluent (e.g., biochemical oxygen demand, suspended solids, toxic substances); and

b. to meet the requirements of §204(b)(1)(B), the states should enact legislation expressly authorizing recovery from industrial users of the federally funded portion of construction costs attributed to treating industrial wastes; and

c. to recover these costs from industrial users, each major contributor of industrial wastes into the system should be required to give firm commitments to pay its share. "Major" is determined by the impact of the characteristics of the industry's discharge into the system. For less than major contributors, a charge system should be devised so as to recover costs from them as a class. Agreements by an industry to repay costs should be transferrable to a new or different industry to permit the latter to discharge into the system.

6. §208(c)(2)(F)

Since most waste treatment agencies have adequate authority to incur short- and long-term indebtedness as required by this Section, the applicant agency should make certain of approval from all elected and administrative entities and should ensure that all procedures required by state and local laws have been followed. This is to ensure that the funding is not contingent upon securing such approval.

7. §208(c)(2)(G)

To comply with this Section, many states should enact specific statutory authority requiring that each participating community pay its share of treatment costs. In all cases, the areawide plan should make the same requirement.

a. In the case of interlocal agreements, the proportionate shares of each participating community should be openly and freely agreed upon and made part of the general agreement.

8. §208(c)(2)(H)

It is highly unlikely that an operating agency would cut off sewer service to a municipality or subdivision thereof which does not comply with any provision of the areawide plan as provided in this Section. State laws, therefore, should authorize waste treatment management agencies to deny service to any new users within the noncomplying municipality or subdivision, and/or to assess penalties against it which would assure compliance within a reasonable time. Such laws should include adequate notice or warning periods to permit voluntary compliance.

9. §208(c)(2)(I)

In the case of treatment of industrial wastes, as provided in this Section, waste treatment management agencies (or state laws or regulations) should establish pretreatment standards for industrial pollutants which, if not pretreated, either would not be susceptible to treatment by the treatment plants or would interfere with the operation of the treatment plants. The waste treatment management agency should also make provision to control and assist in the disposition of waste which treatment plants cannot accept.

10. §208(c)(2) -- General

To overcome problems of the noncompliance (non-cooperation) of communities within the area encompassed by an areawide plan, an areawide agency or a state agency should have the power either (i) to require compliance from all municipalities and agencies encompassed by the areawide plan or (ii) to take over all or part of the functions of the noncomplying community and perform in accordance with the areawide plan.

a. As an alternative or supplement, the permit system and grant system of the state should be used to influence noncomplying communities.

RECOMMENDATIONS ABOUT §208(b)(2)(C)

1. §208(b)(2)(C)

The states should enact legislation requiring that areawide planning agencies and/or waste treatment management agencies have enough input into land use planning so as to influence (or control) the location of facilities discharging pollutants into the area's waters.

SECTION III

INTRODUCTION

Purpose and Scope

The subject of this report is areawide management of wastewater treatment. The report deals with certain sections of the Federal Water Pollution Control Act Amendments of 1972, henceforth referred to as the Act. It is written for all personnel who will have responsibility for implementing that Act: local, state, and federal. It is meant for use by people with different skills, backgrounds, and jobs: planners, managers, elected or appointed officials, engineers, lawyers, and others concerned with the practical problems of water quality management. The Act contains many implications, both important and new to the improvement of water quality. On one hand, it sets out requirements for federally-funded projects and the methods for meeting those requirements; on the other hand, it offers opportunities for innovation and imagination which may have major effects during the coming years. This report identifies some of the problems, the requirements, and the opportunities offered by certain important sections of the Act.

The report focuses on §208(c)(2) of the Act and related sections, particularly as they affect state and community actions. §208(c)(2) addresses specific problems of wastewater management. It sets forth the capacities and capabilities ("adequate authority") which waste treatment management agencies must have in order to be accepted by the Administrator of the United States Environmental Protection Agency as eligible for federal grants for the construction of treatment works. Related sections of the Act covered in this report deal with the planning and regulatory aspects of Title II. Other provisions of the Act deal with funding for planning, required state and areawide planning, standard setting, enforcement, permit systems, etc. The particular importance of §208(c)(2), and the reason for its selection as the subject of a special study, is that it deals with the nature, operations, and requirements of agencies that will make application for construction grants. Its significance to local and areawide agencies is, therefore, of primary importance.

The thrust of the research was in two directions: the legal authority of present wastewater management entities; and the management structure and framework of wastewater management agencies present and future. By analysis of the laws of the 50 states, the study focused on whether those entities currently empowered to perform wastewater management functions have adequate legal authority both to perform as required under the new Act and to implement possible new management arrangements. Then, by examining a group of existing management arrangements, the study set out to describe problems which may emerge in establishing management agencies in accordance with the Act, and also to delineate satisfactory alternative management frameworks (or models). The study, therefore, focused on both the legal and the practical problems of setting up a management structure for water quality control, especially as concerns planning.

The study was conducted by a multidisciplinary team including both legal experts and personnel with extensive operational experience. Statutes were surveyed and information was collected from Regional EPA offices. In addition, the contents of the study were determined by extensive conversations with both federal government personnel and persons in the field who presently operate water management agencies. Though these contacts were by no means exhaustive, enough information came from a wide enough variety of sources to make the study broadly inclusive in coverage. A detailed description of the study's methodology appears later in this section.

Background

The Act differs in many important ways from its predecessors. It is both more detailed in requirements, and more flexible in solutions -- a freshly energetic attempt to help states and communities solve the problems of water quality control. Between 1956 and 1972, federal legislation has emphasized essentially two approaches: the construction of treatment plants, and the enforcement of laws against water pollution. The Act, though by no means ignoring these approaches, adds other methods and concepts which offer a much wider range of alternatives to states and communities. The exact nature of these methods and concepts needs still to be specified and can only really be specified as the Act's provisions go into realworld operation. Problems and their implications under the Act need to be identified through cooperation between personnel at all levels of government, including especially operational personnel faced with the daily problems of water quality management. This cooperative process will take time and goodwill -- both of which fortunately seem available.

The Act places considerable emphasis on the need for a planning process in water quality management over a variety of geographic and political units, and this report concentrates on the section of the Act which deals specifically with areawide planning: §208. The words "areawide planning" should not be lightly dismissed, since Congress, recognizing that many previous efforts at improving water quality have failed because they were short-term or geographically uncoordinated, has deliberately created in this Act the time and structure for local and state governments to work together and with the Federal government. Geographical and political units now have the method and funds to cooperate in a systematic and enduring fashion, instead of devising short-term or entirely local methods of control which subsequently do not work satisfactorily. Instead of waiting until the operational stage to find out that some action does not enhance water quality, communities can now discover their problems and fight their battles at the planning state. All viewpoints, including those of the public, can be deliberately incorporated into the planning effort. And the control of water quality within an area -- instead of being isolated as simply a matter of building more treatment works -- can now be integrated with the whole environmental, political, and economic life of a community.

The importance of the term "areawide planning" to those concerned with water quality management is clear in seven basic issues which this report has found necessary to emphasize because of the requirements and implications of §208(c)(2). At local, state, and federal levels, planners will need to consider the following issues:

1. The linkages between the management of wastewater and the management of other residuals (whether solids, gases or energy).

2. The linkages between the management of wastewater, and the management of water supply and other water-oriented activities.

3. The entire range of methods for controlling the quantity and quality of water before and after generation and before discharge to a receiving stream as waste, rather than just conventional "treatment works."

4. Linkages between any water quality management agency and the authority over land use possessed by governments of general jurisdiction.

5. The legal and practical relationships between governments of general jurisdiction and any agency with a single or special function.

6. The question of representation in decisions about water quality contol: what does "representation" mean? who should be represented, and how?

7. The issues of institutionalized flexibility: how does one create a water management agency, which will endure and at the same time easily adjust to dynamic changes as the needs of the area require?

Many of these matters are clearly issues of policy. Although the study which gave rise to this report concentrated on pragmatic legal and management problems in the management of water quality, the researchers found -- as will future planners -- that policy must be a constant determinant of practical actions in this subject-area. Policies about public issues are determined by value-systems; there is almost no objective basis for determining what constitutes the "best" policy with regard to a public issue. In this report, however, some consistent attempt was made to evaluate policy in an objective manner by four criteria: representation, information generation, economic efficiency, and effectiveness. These criteria are discussed more fully later in this section. They do not allow evaluation of great accuracy, but they can lead in the direction of objectivity. For instance, in this report economic efficiency has been measured through conventional economic analysis. The report regards as questionable policies which tend to be economically inefficient or those which tend to redistribute income from lower-income groups to higher-income groups. As another example, the report regards time as a valid measure of effectiveness. The extent to which a given policy objective can be achieved within a reasonable time is a measure of that policy's effectiveness.

Thus, although the issues of water quality control can be rendered highly technical and narrowly practical, they also have broadly human implications. The use, and misuse, of the nation's water supply affects, and is affected by, all our value systems: economic, political, recreational, personal, etc. In the Act the Federal government has attempted to give communities the opportunity to face these practical and value-system problems in a thorough and systematic manner. The following report indicates, to those planning water quality improvement programs, some of the problems in law, management, and behavior they will face, and it suggests the main lines by which areawide planning may operate to solve those problems.

Characteristics of the Act

Some characteristics of the Act need special mention to place this report's discussions in proper perspective.

1. The Act is much more detailed than its predecessors. It establishes goals which are to be met nationwide. It assigns responsibility to the federal government

for implementation and for authorizing the appropriation of funds. It also establishes detailed program plans which statewide and areawide governments and agencies are to follow. §§204 and 208 are good examples of the detail newly required in areawide plans and management. §303(e) is an example of the detail similarly required in statewide planning.

2. The Act continues earlier attempts to achieve water quality by coupling financial assistance with enforcement provisions, but with important variations. The level of federal financial assistance has substantially increased, and it now appears to include support for programs other than conventional treatment works (particularly under §208). As a focus for enforcement, the Act uses effluent limitation standards and a permit system, in addition to water quality standards. Though federal construction grants remain linked with standards enforcement as the basic approach, variations on this basic theme have come into being. For instance, there are now provisions which require systems to be self-supporting through charges to all users, and to be capable of achieving water quality in a more cost-effective manner than by any other option. If effectively implemented, these two provisions will provide water quality at the expense of the user and at the least overall cost.

3. The standards for securing federal grants for a project introduce some new concepts concerning planning, cost effectiveness, and method of operation. For example,

    - The project must have emerged from a planning process in which explicit consideration was given a wide range of alternatives.

    - The plan of which the project is a part must have been selected through a representative process.

    - The proposed system or project must be cost effective.

    - The proposed system or project must be capable of generating adequate revenue through charges to all user categories to sustain a self-supporting program.

- The proposed system must meet water quality standards and any applicable effluent limitation standards.

Such concepts reinforce the integration of planning with operations, and they encourage the study of non-conventional alternatives.

4. Of special relevance to this report, the Act emphasizes areawide or regionalized planning. This continues the trend in federal regulations and legislation toward requiring cooperation in water quality management between units of local government, if such local units are to receive federal funds. (Even before 1972, for instance, regulations promulgated under Section 8 of the Federal Water Quality Control Act of 1965 required a project applying for federal funds to comply with basinwide or metropolitan or regional plans.) In this respect, the words "planning" and "coordination" should be given full weight. The Act clearly does not wish to establish centralized operational control -- areawide czardoms. Equally, however, it seeks to discourage the fragmentation of long-term planning into dozens of local units. It seeks coordination of the optimal number of management agencies and ineterests at the planning stage, so that planning will be realistic and operations smooth.

5. Most important to the present report, the Act (in §208) envisions and encourages areawide management of waste treatment, including control of point and nonpoint sources of pollution. The reasons for adopting an areawide approach arise from the too frequent failures of past attempts to improve water quality through federal funding. Too often, the money spent failed to improve water quality substantially, or it did so at too high a cost; and too often a principal cause of the failure was lack of coordination among political subdivisions. As the Senate Report to §208 states:

> Perhaps the principal cause of inefficiency and poor performance in the management of waste in the metropolitan regions is the incoherent and uncoordinated planning and the management that prevails in many areas of the Nation. Adjacent communities and industries are

> under no mandate to coordinate land use, or water quality planning activities. This results in poor overall performance and the proliferation of many direct and indirect discharge sources into receiving waters. Such diffuse and divergent programs not only intensify pollution problems but they prevent the use of economies of scale, efficiency of treatment methods, and, most importantly, coherent, integrated and comprehensive land use management[1].
>
> The independent functioning of units of government in areas of population concentration without regard to the pollution related requirements of other areas of the same region will not be possible. Uncontrolled growth and expansion and competition among units of government will be reduced if effective environmental controls are to be imposed[2].

It should be added that federal policies and procedures did not always help states and local governments to undertake long-range, areawide planning. Local agencies were often impeded by uncertainties in funding or in the timing of grants, though some areas such as the Seattle Metro program, and the Minneapolis-St. Paul program overcame these difficulties in remarkable fashion.

In sum, therefore, the basic reasons for encouraging areawide planning derive from past bad experiences. Areawide planning should be of particular help to the urban-industrial centers characteristic of our nation, which spread over dozens of political and other jurisdictions. It should improve water quality on a cost effective basis, reduce wasted effort by local agencies, and increase the ease of cooperation among local, state, and federal agencies. It should enable waste treatment agencies to avoid many of the costly or disabling errors which have afflicted local efforts at the operational stage.

6. Areawide planning of water quality control, as envisaged by the Act, will also have an obvious impact on land use planning in the same area. To regard water as a common property resource, with associated costs, and needing planning and management, is to assert that its relationships with land use will require careful and thorough study. The

implications of the Act are that the use of land and the use of water are inseparable, and that the problems caused by their interaction need to be faced rather than avoided.

REQUIREMENTS OF THE ACT

The Areawide Sequence

In several different sections, the Act envisages a planning sequence designed to provide local jurisdictions with the time, the money, and the information to proceed logically from initial planning to full operation and the assessment of performance by a variety of avenues. This sequence is embodies in §§201, 208, and 303(e) and is set forth in The Water Strategy Paper: Statement of Policy for Implementing Certain Requirements of the 1972 Federal Water Pollution Control Act Amendments, issued by the U.S. Environmental Protection Agency (February, 1973)[3].

Section 303

§303 deals with the state-level planning process required under the Act. This is the first, top-level stage of planning, concerned with river basins and the effect of discharges on the receiving waters. Among the most important planning elements are:

- establishing a planning process
- devising water quality standards
- devising effluent limitation standards
- classifying and designating the streams and bodies of water subject to these standards
- providing the institutional mechanisms for enforcement, appeal, etc.

It should be noted that receiving waters are classified into two categories: (1) water quality limited segments, wherein discharges into the receiving waters are controlled by the water quality standards of the receiving waters because application of effluent limitations will not suffice; and (2) effluent limitation standard segments, wherein discharges into the receiving waters are controlled by the effluent limitation standards applicable to the effluent being discharged.

After the §303 planning process is approved and implemented, or when plans result therefrom, §208 plans must conform to it in order for a project to be funded.

Section 201

Section 201 planning emerges from EPA's interpretation of the Act. It deals with areawide planning on a limited basis only, and it is an interim measure to precede implementation of §208 areawide planning. As an interim measure, §201 planning will permit federal funding under the Act prior to implementation of §208 planning.

In fact, the elements of the §201 plan are also required in §208 plan. The §201 plan is aimed at point source dischargers (public treatment works and private dischargers such as industry and commerce), directing attention to the technical effectiveness of waste treatment works. It is also aimed at their cost effectiveness and must be geared to a cost efficiency study. In sum, though the §201 plan is very similar to the §208 plan, it can be smaller in scope: less than areawide in impact, and little concerned at present with nonpoint sources of pollution.

Section 208

In comparison with §201 planning, §208 planning is more complex and long-term. A §208 plan is necessary where water quality problems are of such a nature as to require handling on an areawide basis. §208 plans deal with both point and nonpoint sources of water pollution, and they therefore necessarily affect land use insofar as some control of land use is needed for control of an area's water quality. They are aimed to control problems in areas with critical initial water conditions, or where pollution from nonpoint sources (such as urban run-off) is a major factor to be considered along with point source discharges. They are to coordinate and implement all water pollution control efforts within a stated area. The areas included within a §208 plan are to be designated by the governor of each state. Waste treatment management agencies are to be designated for each area.

Clearly, then, these three sections comprise a flexible and broad opportunity for states and communities to join in areawide planning, in an orderly and sequential manner with both the time and the intention to ensure that all voices are heard at the planning stage. It should be emphasized that the Act specifies certain important elements of the sequence of planning especially affecting the §208 plan. A planning process is initiated under §303, then moves on to §201 and/or

§208 plans. After a §208 plan has been adopted, and after the waste treatment management agency has been designated and approved, then the §208 plan controls. §208(d) provides that the Administrator "shall not make any grant for construction of a publicly owned treatment works under section §201(g)(1) within such area except to such designated agency and for works in conformity with such plan."

Under §208, both an areawide plan and an areawide waste treatment management agency (or agencies) are developed. The following sequence of activities must take place in order to bring this about:

1. On the basis of EPA guidelines describing the nature of areawide jurisdictions, the Governor of a state identifies the boundaries to which the areawide plan will apply. §208(a).

2. The Governor also designates a single representative organizational group to commence the planning process and to design the 208 plan. This group will include a "planning agency." §208(a).

3. Having designed the §208 plan according to the Act's requirements, the organizational group (through the Governor) submits the plan to EPA for the Administrator's approval. §208(a).

4. At the same time, after consultation with the planning group, the Governor designates the waste treatment management agency (or agencies) to be responsible for implementing the plan. He submits it (them) to the Administrator for approval at the same time as the plan. §208(c).

5. EPA examines the plan and the designated agencies according to criteria set out in the Act. §208(b).

6. To gain approval, a waste treatment management agency must meet the requirements of §208(c)(2).

Planning: §208(b)

The requirements for a §208 plan to gain approval are set out in §208(b). In order for a §208 plan to be approved by the Administrator of EPA, it must include, but is not limited to,

(a) The identification of treatment works necessary to meet anticipated needs over a twenty-year period; necessary wastewater collection and urban stormwater runoff systems; and a program to provide necessary financial arrangements;

(b) The establishment of construction priorities and time schedules for initiation and completion;

(c) The establishment of a regulatory program to implement requirements of §201(c), to regulate location of facilities which result in discharges in the area, and to assure that industrial wastes discharged into a treatment works meet applicable pretreatment standards;

(d) The identification of those agencies necessary to construct, operate, and maintain all facilities required by the plan and otherwise to carry out the plan;

(e) The identification of the measures necessary to carry out the plan (including financing), the period of time necessary to carry out the plan, the costs of carrying out the plan within such time, and the economic, social, and environmental impact of carrying out the plan within such time;

(f) A process to (i) identify, if appropriate, agriculturally and silviculturally related nonpoint sources of pollution, including runoff from manure disposal areas, and from land used for livestock and crop production, and (ii) set forth procedures and methods (including land use requirements) to control to the extent feasible such sources;

(g) A process to (i) identify, if appropriate, mine-related sources of pollution including new, current, and abandoned surface and underground mine runoff, and (ii) set forth procedures and methods (including land use requirements) to control to the extent feasible such sources;

(h) A process to (i) identify construction activity related sources of pollution, and (ii) set forth procedures and methods (including land use requirements) to control to the extent feasible such sources;

(i) A process to (i) identify, if appropriate, salt water intrusion into rivers, lakes, and estuaries resulting from reduction of fresh water flow from any cause, including irrigation, obstruction, ground water extraction, and diversion, and (ii) set forth procedures and methods to control such intrusion to the extent feasible where such procedures and methods are otherwise a part of the waste treatment management plan;

(j) A process to control the disposition of all residual waste generated in such area which could affect water quality; and

(k) A process to control the disposal of pollutants on land or in subsurface excavations within such area to protect ground and surface water quality.

In addition, the areawide plan must be certified annually by the Governor (or his designee) as being consistent with applicable basin plans. Of the requirements listed above, clauses (f) through (k) may be developed and submitted on a statewide basis if consistent with a §303 plan.

Management: §208(c)(2)

In §208(c)(2) appear the requirements imposed on a waste treatment management agency if it is to receive approval by the Administrator of the EPA. The requirements of §208(c)(2) are implemented or enforced by the Administrator, who has the authority to accept or reject the management agency designated by the Governor. The criteria for rejection are set out in §208(c)(2) as follows:

> (2) The Administrator shall accept any such designation, unless within 120 days of such designation, he finds that the designated management agency (or agencies) does not have adequate authority
>
> (a) To carry out appropriate portions of an areawide waste treatment management plan developed under subsection (b) of this section;
>
> (b) To manage effectively waste treatment works and related facilities serving such area in conformance with any plan required by subsection (b) of this section;
>
> (c) Directly or by contract, to design and construct new works and to operate and maintain new and existing works as required by any plan developed pursuant to subsection (b) of this section;

(d) To accept and utilize grants, or other funds from any source, for waste treatment management purposes;

(e) To raise revenues, including the assessment of waste treatment charges;

(f) To incur short- and long-term indebtedness;

(g) To assure in implementation of an areawide waste treatment management plan that each participating community pay its proportionate share of treatment costs;

(h) To refuse to receive any wastes from any municipality or subdivision thereof, which does not comply with any provisions of an approved plan under this section applicable to such area; and

(i) To accept for treatment industrial wastes.

It is not required that a single management agency have all these authorities. Two or more agencies, each with adequate authority to perform in compliance with the areawide plan, may collectively meet the requirements of §208(c)(2).

In addition to the requirements imposed by §208(c)(2), a waste treatment management agency must also meet the requirements imposed by other sections of the Act. For example, to be accepted by the Administrator, a waste treatment management agency must conform not only with the areawide plan, but must also adopt an acceptable system of user charges. Such relationships between §208(c)(2) and other sections should always be kept clearly in mind.

Particular Projects

In addition to the general requirements listed in the previous section for the acceptance of a designated waste treatment management agency, other sections of Title II (Grants for Construction of Treatment Works) impose requirements on particular projects after a §208 plan is adopted. Some of the most important are noted in this section.

Some requirements for a particular project appear technological in nature. As an example, §201(g)(2) provides that the Administrator shall not make a grant for a treatment works (from funds authorized for any fiscal year after June 30, 1974) unless the applicant has satisfactorily demonstrated that (a) alternative waste management techniques have been evaluated and that the proposed project represents the application of the best practicable waste treatment technology; and (b) as appropriate, the proposed project takes into account and will allow the application of technology at a later date which will provide for reclaiming or recycling of water or otherwise eliminating the discharge of pollutants. As noted in Section V of this report, the consideration and adoption of alternative techniques is vital if water quality management is to be accomplished as envisaged under the Act. §201(g)(3) also requires the applicant to show that the sewer collection system discharging into the proposed works is not subject to excessive infiltration. From a technological and operational point of view, meeting these requirements can be both difficult and costly.

§203(a) of the Act requires that the applicant submit for the Administrator's approval the plans, specifications and estimates for the project.

§204(a) provides that, before approving any grants, the Administrator shall determine: 1) that the works are included in any applicable areawide waste treatment management plan developed under §208 of the Act; 2) that such works are in conformity with any applicable state plan developed under §303(e) of the Act; 3) that such works have state certification as to priority within the state in accordance with any state plan developed and §303 (e) of the Act; 4) that the applicant agrees to pay the non-Federal costs of such works, and has made provision for proper and efficient operation; 5) that the size and capacity, including reserve capacity, of the works relate directly to the needs to be served; and 6) that no specifications for bids are so written as to contain priority, exclusionary or discriminatory requirements.

The waste treatment management agency must also be cognizant of, and be prepared to overcome, any adverse effects on the environment. §511(c) of the Act provides that action of the Administrator in approving a grant for a publicly owned treatment works as authorized by §201 is not exempted from the impact statement requirements of the National Environmental Policy Act of 1969. The applicant must, therefore, be in a position to supply information for the required impact statement.

The foregoing are not exhaustive, but are examples of requirements imposed on particular projects for which federal funding is sought.

After a §208 plan has been adopted and approved by the Administrator, there is a clear sequence of requirements for any project in the area applying to be approved and funded. The major requirements are as follows:

1) The applicant (waste treatment management agency) must be accepted by the Administrator, and, in order to be accepted, the applicant must have adequate authority either alone or in conjunction with other agencies (i) to carry out its (their) appropriate portions of the areawide plan and (ii to perform as otherwise required.

2) The proposed project must be in conformity with any applicable state plan and be certified by the state agency as having priority for funding.

3) The proposed project must comply with the areawide plan and be under management of an approved management agency.

4) The proposed project must meet the technical and special requirements of the Act as promulgated by the Administrator.

REPORT SUMMARY

Effective planning on a functional basis can overcome or avoid many of the problems posed by §208(c)(2), and the purpose of this report is to identify some of the legal and management issues which §208 planners will have to resolve. This section presents an overview of the rest of the report, identifying the central issues which arose during the study.

Section IV of the report faces an issue crucial to existing water quality management agencies: do those entitites currently performing the wastewater treatment functions within each of the 50 states now have adequate legal authority to meet the provisions of §208(c)(2)? This issue is highly complex, and it is necessary to read the discussion in Section IV. Roughly speaking, though some requirements will offer no difficulty, a prospective waste treatment management agency should not count on its present general powers as giving that "adequate authority," but if in doubt should seek special legislation. Appendix A contains suggested or model legislation regarding such "adequate authority." Section IV covers other legal problems which may also face the typical waste treatment management agency. Appendix B contains a brief report on each state as well as the format used in researching state laws.

Section V, in parallel fashion, surveys the management problems likely to face a waste treatment management agency. Selected agencies already in operation were analyzed in order to identify management problems likely to arise during the implementation of §208(c)(2). These problems were then examined in relation to broader problems emerging when other sections of Title II are also implemented. In examining the existing agencies, certain criteria were used to make comparisons between different agencies: the structure and organization of the agencies; their powers, duties, and needs; and their responsibility to state and local governments and to the public. Areawide planning (as under §208) is essentially a matter of turning existing geographic and hydrologic realities into political and administrative realities. While detailed reading of Section V will indicate the multitude and variety of problems encountered in this process, the survey also showed that there are at least three models of water quality management (areawide, basinwide, and regionalized state) which are suitable for local modification and implementation when supported in certain clearly specified ways.

Section VI enlarges upon the three models of water quality management mentioned above: (a) an areawide arrangement patterned along the lines of a sanitary district or metropolitan sewer board; (b) an intrastate basin arrangement; and (c) a regionalized state arrangement. Section VI delineates each type according to its activities, structure, planning process, and decision-making characteristics, so that prospective planners will have a clear idea of the appropriateness of each model to their own situation. Though this study concentrated on problems in implementing §208(c)(2), other issues arose which need consideration if the §208 problems are to be seen in perspective. Section VI therefore also deals with some of these larger issues, notably the interrelationship between the problem of identifying boundaries for a management agency and the problem of specifying arrangements which will ensure adequate representation in the process of decision-making. Though the Section may sound "theoretical," its information is based on the real experience of existing agencies, and planners will find that these general issues will heavily influence the fundamental decisions they must make.

Section VII is a necessary addendum to Sections V and VI. In brief form it assesses the legal problems in implementing the management models mentioned in those Sections. Since areawide planning essentially involves some shift from local control toward a broader control, it will encounter legal problems in many states, and this Section outlines the kind of problem which a planner may expect to face when he examines his own state's legal situation.

Section VIII deals with the effect of the Act on land use planning, brought about by the relationship between §§201(c), 208(b), and 208(c)(2). As an example, the plans for areawide waste treatment management must include a program to regulate the location of any facilities in the area which may result in any discharge in the area. Thus the waste treatment management agency must have some control over the location of such facilities, which is a clear relationship with land use. Section VIII discusses some of the ramifications of this important issue. It also discusses briefly other mechanisms which might be utilized to assist in implementing the Act.

RESEARCH METHOD

To understand the conclusions and recommendations embodied in this report, it is helpful to know the information base on which they were developed and the method by which the research team acquired the information during the course of the study. This section details the study's methodology in both legal and management areas. The advice and suggestions of consultants knowledgeable of and experienced in the problems of water quality control were obtained during each step of the legal and management research studies.

Legal Studies

The study of legal problems affecting waste treatment management agencies resulting from the provisions of §208(c)(2) of the Act was conducted as follows:

1) Review of the proposed Act (then S.2770 and H.R. 11896) and later the Act itself with emphasis on §208(c)(2).

2) Review of prior federal acts, general literature about them, and of other background materials.

3) Development of a format to guide the researching of state laws.

4) Research of state laws and drafting of state reports. (Appendix B.)

5) Research and preparation or selection of model legislation. (Appendix A.)

6) Revision of the format for state reports to include (i) identification of reasonable implications from typical general state laws and (ii) necessary assumptions as to the meaning of sections of the Act.

7) Preparation of this report, model legislation, and state reports.

The study also required extensive contact with personnel across the country. Each state and U.S. Environmental Protection Agency (EPA) regional office was conducted by letters and questionnaires soliciting information as to practices, laws, regulations, publications, and other sources of information. All EPA regional offices responded with the requested information. Most states also responded with very helpful information, although a few failed to respond despite second requests. After revision of the format for state reports and after preparation of state reports, selected states were furnished copies of the format and their state report with a request for comments. The replies confirmed the results of the research and provided further insight into the problems of the states and their waste treatment management agencies in complying with the requirements of §208(c)(2) of the Act.

The following is a brief commentary on each step in the research.

1) The review of the Act resulted in a keen awareness of the interrelationship of many of its provisions. The provisions of §208(c)(2) could not be isolated from provisions with respect to areawide planning. These latter provisions could not be isolated from provisions dealing with designation of areas by the governor, appointment by the governor of a representative organization to develop areawide plans, and development of a state planning process. This interrelationship required in some instances broadening the scope of the treatment of §208(c)(2), and in other instances assuming that compliance with related provisions of the Act already existed.

2) The review of prior acts and other background materials revealed that some provisions of the Act were entirely new while other provisions were already in prior legislation or had existed in the form of regulations, guidelines or practices under prior acts.

3) Based on the review of the Act, the format for state reports was prepared. The interrelated sections of the Act and the assumptions which were made were noted in the format and continue to be a part of it. The format as revised appears as part of Appendix B of this report.

4) With the format as a guide, research of state laws was conducted, and state reports prepared. The assumptions and implications set forth in the format

were not for the most part repeated in the state reports. It is necessary, therefore, to read the format in conjunction with each state report. This admonition is set forth quite clearly in the format. Research and reporting were limited to state laws although local ordinances and laws enacted pursuant to a state enabling law will certainly be pertinent in determining compliance with §208(c)(2) in individual cases. The introduction to the format makes clear this limitation of the state reports. The state reports appear as part of Appendix B to this report.

5) As a result of the research of state laws, certain problem areas appeared. Suggested remedial legislation was therefore prepared. Recent legislation in some states provided a basis for some of the suggested remedial legislation. Model legislation preprepared by the Council on State Governments, and the Interlocal Cooperation Act prepared by the U. S. Advisory Commission on Intergovernmental Relations were also used as models. The sources of model legislation are noted with each model law or set of laws. The model remedial legislation appears as Appendix A to this report.

6) After most of the research on state laws was completed, the format was revised to act as a supplement to each state report. Thus the revised format not only provided a guide for research, but is also an integral part of each state report. As noted previously, this revised format appears as part of Appendix A.

7) This report was prepared after the foregoing steps were completed.

Management Studies

The general objective of this study was to provide recommendations and models to help implement the water quality management arrangements required by §208. The management studies approached this objective by three basic tasks. First, a search of state policy and relevant literature was undertaken. This search focused on the administrative history, legal authority, and organizational structures of water quality control agencies for state, interstate, and regional jurisdictions.

The second task was to assess selected existing management agencies. The criterion for selecting these agencies was areal basis: a selected agency could be described as less than areawide, areawide, basinwide (interstate and intrastate), and statewide. However, consideration was given to availability of information about agencies in the literature. Agencies that had already been studied extensively would: (a) be better equipped to respond and be more responsive to our requests for information; (b) probably be more aware of the legislative provisions in this Act and hence how they would be affected by them; and (c) more likely to be eligible for funding under the provisions of the Act. It seemed likely that the more sophisticated management agencies would have anticipated problems in implementing this legislation, and it seemed probable that most operating agencies would encounter problems. Site visits were made to a number of these to interview their managers. Interviews were held with Seattle Metro, Miami (Ohio) Conservancy District, Metropolitan Sanitary District of Greater Chicago, Twin Cities (Minnesota) Metro Sewer Board, and the Northeastern Illinois Planning Commission. Additional contacts were made by mail and telephone with a number of other agencies. The purpose of these site visits was to gain a clearer understanding of the present legal and political environments in which they function, to review present administrative organizations and operating procedures, and to assess current policy implementation approaches.

The final task was to assess alternative management approaches with respect to implementing §208 of the Act in order to determine specific problems that might arise for existing agencies.

RESEARCH CONCEPTS

Obviously a research team studying a topic of such import as water quality management has certain basic concepts, and a certain terminology, which structure the research. This section sets out those concepts, states the assumptions made by the research team, and defines the terms used throughout the report. (Other definitions appear in the Glossary in Section IX.)

The Water Management System

Given the fundamental tasks of identifying the problems which federal, state, and local agencies may face in implementing §208, and of recommending appropriate responses to those problems, the research team needed a research approach which would serve to obtain both detail and variety. For this reason, the concepts of systems analysis were used. In general, the systems approach regards water resources as an input into a water management system which is meant to achieve improvement in the quality of the environment. While the management of water quality (upon which this study focused) supposedly confines itself only to considerations of water quality, the research team concluded that other considerations concerning water -- especially water quantity -- cannot be treated completely separately. Especially, the separation of different management activities into those which deal with water quality and those which deal with water quantity is an inefficient management arrangement. Hence the concept of the water management system, dealing with all activities connected with a production function in the traditional economic sense. In other words, water resources are inputs to the water management system, and the outputs of that system are some combination of water-related goods and services[4].

To elaborate upon this description briefly, the water resources which are inputs to the water management system possess certain characteristics (quantity, quality, time, and place), to each of which the water management system must make an adequate response. The water management system transforms water resources into water-related goods and services (outputs). The water management system itself contains both physical and non-physical elements. It includes, of course, the visible structures and physical measures by which water is managed. It also includes the management institutions through which water resources are transformed into goods and services. And finally it also includes the policies which direct the way in which the institutions, structures, and measures will operate. The ultimate objective of this system is the improvement of environmental quality, broadly defined, by the production of such water-related goods and services as electric energy, flood damage reduction, recreation, and navigation for municipal, industrial, or agricultural purposes.

The concept of water management system proved both simple and useful to the research team. It encourages analysis of water as a resource to be managed by responsible cooperating agencies, like any other resource capable of being turned into desirable products. It emphasizes the idea of responsible management of that resource with the objective of sustaining maximum quality in the final products, whatever they might be. Transferred to any given geographical area, the system concept provides a consistent rationale for practical planning actions.

Evaluating Water Management Systems

Any water management system should possess certain essential characteristics. It needs the ability to:

- Use the full range of governmental tools for influencing water use and development.
- Participate in the management of other residuals (gaseous, solid, energy, as well as liquid).
- Consider and adjust to externalities stemming from hydrologic interdependcies.
- Adapt water management actions to different circumstances of time and place with protection against arbitrary and capricious actions.
- Express and consider the range of values relevant to a water management decision.
- Recognize and incorporate water management activities into governmental operations on a continuing basis.
- Finance water management efficiently.

From these characteristics, the research team developed a set of criteria against which to assess any water management agency, or in other words to evaluate any institutional arrangement for water management[5]. There are four major criteria:

1. Representation -- Institutional arrangements (water management systems) should be designed so that each individual has the opportunity to participate in decisions involving value preferences that affect him.
2. Information Generation -- Institutional arrangements (water management systems) need the capability to develop data on a range of water quality management alternatives and their consequences. Further, they should develop plans and analyses for water development which reflect the range of perceptions and value preferences held by the segment affected. Where substantial difference exists in value preferences, two or more major information generating units may be required.

3. Efficiency -- Institutional arrangements (water management systems) should be capable of weighing external effects of decisions; they should foster efficient results in light of physical, chemical, and biological characteristics of water resources, available technology, and human behavior. This means institutions must be adapted to the specific physical situation and technology available, but they must also be capable of adapting to changing conditions, i.e., changing technology.

4. Effectiveness -- Institutional arrangements (water management systems) must offer reasonable promise of achieving the results sought within a reasonable time period.

Definitions

Certain crucial words used in the Act possess several meanings in common usage: notably the terms "treatment works," "portion," "areawide," and "full cost recovery charge." The meaning used by the research team for each term is given below.

The definition of treatment works in §212 of the Act, particularly Part II, B, was important to the research:

> (2)(A) The term 'treatment works' means any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature to implement section 201 of this Act, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, outfall sewers, sewage collection systems, pumping, power, and other equipment, and their appurtenances; extensions, improvements, remodeling, additions, and alterations thereof; elements essential to provide a reliable recycled supply such as standby treatment units and clear well facilities; and any works, including site acquisition of the land that will be an integral part of the treatment process or is used for ultimate disposal of residues resulting from such treatment.
>
> (B) In addition to the definition contained in sub-paragraph (A) of this paragraph, 'treatment works' means any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste,

> including storm water runoff, or industrial waste, including waste in combined storm water and sanitary sewer systems. Any application for construction grants which includes wholly or in part such methods or systems shall, in accordance with guidelines published by the Administrator pursuant to sub-paragraph (C) of this paragraph, contain adequate data and analysis demonstrating such proposal to be, over the life of such works, the most cost efficient alternative to comply with Sections 301 or 302 of this Act, or the requirements of Section 201 of this Act. (Emphasis added.)

It should be noted, in other words, that "treatment works" is not limited to mean conventional sewage treatment plants, and this report therefore avoids the conventional usage.

The word portion is of special importance to §208(c)(2)(A), which provides that the waste treatment management agency (or agencies) have authority to carry out "appropriate portions" of the §208 areawide plan. The term "portions" includes but is not limited to a geographic meaning. It has functional and administrative connotations as well. Thus an agency (or agencies) may perform one or more of the required functions or administrative tasks, with the result that a number of agencies may be assigned or delegated different tasks under the §208 plan, rather than one agency being required to perform all required functions. The greater flexibility inherent in this definition is important to the alternative models, to the solutions of problems identified in this report, and to the utilization of existing agencies which can perform as required.

This report defines areawide to mean the area designated as such pursuant to §208(a). Such areas are those which have substantial water quality control problems, whether because of urban-industrial concentrations or other factors. An area might be a Standard Metropolitan Statisticsl Area (SMSA), or a part thereof, as defined by the Office of Management and Budget. Hence the term "areawide" must delineate a geographical area which corresponds to the area designated by the terms "water quality problem area" and/or "urban-industrial concentration." A substantial water quality control problem may be said to exist only where its complexity and nature require an areawide waste treatment management plan, and also where (a) a substantial portion of the receiving waters cannot meet water quality standards or (b) a substantial and extensive groundwater pollution problem exists.

Full cost recovery user charge means any mechanism which levies a price on discharges for the purpose of creating an incentive to affect the quality and/or the quantity of the discharge and, in effect, charges the user for utilization of a common property resource.

NOTES

SECTION III

1. Committee on Public Works, Federal Water Pollution Control Act Amendment of 1971 Senate Report No. 92-414, 92nd Congress 1st Session, October 28, 1971. p. 36.

2. Ibid, p. 37.

3. The adoption, timing, and implementation of §303, 201, and 208 planning as described in this report is set forth in detail in Water Strategy Paper (Statement of Policy for Implementing Certain Requirements of the 1972 Federal Water Pollution Control Act Amendments), released by the U. S. Environmental Protection Agency on February 27, 1973.

4. Lyle E. Craine, Water Management in England, Resources for the Future, Johns Hopkins Press, 1969. Chapter 2, pp. 5-22.

5. These criteria emerge from a review of relevant literature in the field. Among the better expositions on this topic are:

   Allen V. Kneese and Blair T. Bower, Managing Water Quality: Economics, Technology, Institutions, Resources for the Future, Johns Hopkins Press, 1968 Chapter 1A.

   Irving K. Fox, Water Resources Policy in Wisconsin: A Summary Assessment, The University of Wisconsin, Water Resources Center, 1971, Chapter 1.

SECTION IV

ANALYSIS OF LEGAL PROBLEM AREAS OF WASTE TREATMENT MANAGEMENT AGENCIES IN COMPLYING WITH §208(c)(2) OF THE ACT

INTRODUCTION

There are legal constraints existing within the states which make it difficult, if not sometimes legally impossible, for some existing waste treatment management agencies at local, areawide and regional levels within a state, or interstate, to meet the requirements of §208(c)(2). If they cannot meet such requirements, such management agencies will not be deemed to have "adequate authority," and their designation will not be accepted by the Administrator.

A waste treatment management agency may have many functions only one of which is the construction and operation of a publicly owned waste treatment works for sewage collected in its system. Under the Act, the word "management" envisions more than operation of a waste treatment works. It might more appropriately be called a water quality management agency.

A waste treatment management agency whose primary or sole function is the operation of a waste treatment works may comply with the requirements of the Act _if_ other agencies operating in the area served by the applicant satisfy the other requirements of the Act. In other words, one waste treatment management agency may perform all the required functions, or several agencies operating in the area -- each performing different required functions -- may collectively perform all the required functions. One function is construction, operation and maintenance of publicly owned waste treatment works. This function is closely allied with other functions such as establishing a charge system, incurring indebtedness and utilizing grants for construction purposes. Other functions include, but are not limited to, planning, regulation (including establishing of standards), identification of nonpoint sources of pollution and procedures to control such nonpoint sources, enforcement, and other activities such as materials recovery and effluent monitoring. All functions considered together constitute the plan to improve water quality in the area.

It should also be noted that more than one waste treatment management agency may be performing the same function -- e.g., operation of a waste treatment works -- in the area encompassed by the areawide plan. Thus, this particular agency's "portion" of the plan is both functional and geographic. Excessive geographic fragmentation -- i.e., many agencies performing the same function within the area -- should be avoided, however, as such fragmentation leads to inefficiencies, difficulty in assigning responsibility and generally detracts from the areawide concept. As an example, operation of treatment works could be done by several local agencies within the area without detracting from the areawide concept, but planning, enforcement, and control of nonpoint sources should be performed by an agency or agencies operating throughout the area.

GENERAL LEGAL CONCEPTS TO BEAR IN MIND

It is important to bear in mind some rather basic legal concepts applicable to the powers and authorities of municipalities and administrative agencies and to disregard some "perceived" legal concepts which no longer have much vitality in this area.

It should be noted first that municipal corporations and administrative agencies do not have, as a general rule, any inherent powers except as may be reserved or delegated to them by a state constitution. Examples of such constitutional reservation or delegation to municipalities are the "home rule" provisions existing in some states[1]. For the most part, municipal corporations and administrative agencies garner what authority and powers they have from the legislature which creates them[2].

In the case of delegation of powers to municipal corporations, it is generally held that such delegation of power may be broad and of the most general nature, while more detailed delegations are required for administrative or executive agencies[3].

A second point to bear in mind is simply that it is better for a municipality or an agency to have express statutory authority to perform in a certain manner or to do certain acts rather than to rely on an implied authority garnered from some power expressly conferred. As an example, a waste treatment management agency may have express authority to accept federal grants and to do all things necessary in order to secure such grants. In order to be eligible for a grant under §201, the agency must have, as required by §208(c)(2)(F), adequate authority to incur short- and long-term indebtedness. In the absence of express authority for this particular agency so to incur indebtedness, it is somewhat risky to imply such authority from the express power to accept a federal grant and to do all things necessary to secure it[4].

This second point is based on the concept that implied powers must arise by necessary or fair implication from express powers granted to the municipality or agency. The risk in relying on an implied power without prior judicial determination is that the courts take different positions depending upon all of the circumstances involved[5]. Some courts take a very strict constructionist view[6]. In the final analysis, what can reasonably be implied is generally resolved by the courts taking into consideration legislative intent, what type governmental entity is involved, other specific legislation bearing on the powers of the agency, constitutional limitations, reasonableness of the inference, and so on. Thus, it is preferable to have express authority to so act rather than rely on an implied power.

The concept of unconstitutional delegation of legislative powers to administrative agencies appears to have little adverse effect on state pollution laws. State laws setting forth broad general policies and then delegating implementation to state and/or local agencies have been upheld when attacked. This is particularly true where the general health and safety of the public is involved and where a certain expertise is needed to implement the policies of the law. In addition, where notices, hearings and fair administrative procedures are required, and where decisions by the agency are subject to judicial review, the broad delegations are upheld. It has been observed by an eminent authority on state administrative law that "almost any extent of discretionary power may be delegated if public safety is significantly involved, and there is a need for the exercise of an expert judgment which the agency undoubtedly possesses, and if its procedures afford fair hearings, and adequate judicial review is provided[7]."

As examples, Pennsylvania and New Jersey defined "air pollution" in general terms. State agencies to which had been delegated the regulation and enforcement of air pollution controls established standards and proceeded to prosecute persons who violated the standards. The violators defended on the basis of an unconstitutional delegation of legislative authority, but to no avail. The courts in both states upheld the convictions of the violators and dismissed their defenses for several reasons including the facts that public safety and health were involved, the need for expertise in administration (the state need do no more than define broadly "air pollution"), and the fact that hearings and judicial review were provided[8]. In 1970, a delegation by 14 Iowa cities and municipalities of solid waste management to a metropolitan area solid waste agency was upheld. The court, in upholding the delegation, stated that the new quasi-municipality could be created, pre-existing powers of each participant furnished the standards for implementation by the new agency and the objective of improving the health and safety of the people dictated a liberal construction[9].

As applied to the requirements of §208(c)(2), this means that legislation need not detail every power or authority of the waste treatment management agencies, but it should, as observed earlier, expressly confer an authority to perform certain acts rather than leave this to implication or inferrence. Whether the delegation is to a municipal corporation or to a limited jurisdiction administrative agency is also a factor determining the detail required in the delegation of authority.

These are but a few examples of legal concepts and their application to analyzing the application of §208(c)(2) to waste treatment management agencies (whether they be municipalities or administrative agencies).

PREVALENT LEGAL CONSTRAINTS AND PROBLEMS

The following is an analysis of what is required of a waste treatment management agency (or agencies) if it is to be accepted by the Administrator as having "adequate authority" under §208(c)(2). The analysis focuses on the construction, operation, and maintenance of publicly owned treatment works for the reason that this is the function for which most applicants will seek funding, although alternatives should not be overlooked since they can also be funded under the broad definition of treatment works in §212(2). The more prevalent legal constraints and problems are noted. The analysis follows the order of the requirements set forth in §208(c)(2) with additional references to other provisions of Title II and the Act where deemed particularly pertinent.

The review of state laws with respect to the powers, authority and duties of waste treatment management agencies -- in most instances, a city, county, sanitary district, or similar governmental entity owning and operating a treatment works -- reveals some areas in which legal problems are prevalent as well as areas in which there are relatively few legal problems. As an example, most agencies have the authority to construct, operate, and maintain a treatment works. On the other hand, very few agencies (whether they be state, areawide, or local) have authority to cut off treatment services to any municipality or subdivision thereof which does not comply with any provisions of the areawide plan. In considering each of the "adequate authorities" required by §208(c)(2), it is noted whether constraints and problems exist.

In considering a waste treatment management agency as broadly defined -- i.e., an agency performing many functions in addition to operation of a conventional treatment works -- a review of state laws indicates that very few existing single agencies satisfy all requirements of the Act. In most instances, such agencies operate the treatment works while other required functions are performed, if at all, by other agencies operating both within and beyond the jurisdiction of the operator of the treatment works. As an example, a municipality or sanitary district may operate a treatment works while the board of health or a water pollution control agency will regulate industrial discharges into streams and rivers. This division of authority with respect to water quality control is sometimes brought about by the legal constraints under which each agency performs. In other instances the impetus may be political or merely expedient, but the divisions of overall authority for water quality control exist and must be recognized. As recommended earlier, however, an effort should be made to reduce the number of agencies involved -- i.e., reduce fragmentation.

Authority to Carry Out Areawide Plan -- §208(c)(2)(A)

§208(c)(2)(A) of the Act requires that the waste treatment management agency must have adequate authority to carry out appropriate portions of an areawide waste treatment management plan developed under §208(b). There is, as a result, an interrelation between the legal capacity of the agency and the areawide plan.

§208(b), which mandates the areawide plan, sets forth what must be included in such an areawide plan. Among the required elements of the areawide plan are: (a) identification of treatment works necessary to meet anticipated demands and a program to provide the necessary financial arrangements for the development of such treatment works; (b) establishment of construction priorities; (c) establishment of regulatory programs to control point and nonpoint sources of pollution as well as regulate the location of point source discharges (see Section VIII of this report for a discussion of this regulatory program); (d) identification of those agencies necessary to carry out the plan, including operation of all required facilities; (e) identification of measures necessary to carry out the plan and the economic, social and environmental impact of carrying out the plan; (f) a process to identify and control agriculturally-related nonpoint sources of pollution; (g) a process to identify and control mine-related sources of pollution; (h) a process to identify and control construction activity-related sources of pollution; (i) a process to identify and control salt water intrusion; (j) a process to control disposition of all residual waste which could affect water quality; and (k) a process to control disposal of pollutants on land to protect ground and surface water quality. One agency could perform all of these tasks, but there are very few instances of this in the states. In the overwhelming number of cases, several agencies are involved in a given area in performing these functions. As noted in item (d), the areawide plan must identify those agencies necessary to carry out the plan. Until such plan is devised, it cannot be ascertained whether a particular agency has the legal capacity to perform the function assigned to it. If the areawide plan is drafted carefully and with the powers of existing agencies in mind, appropriate functions which each agency can perform can be assigned to such agency. The planning process can also be instrumental in reducing fragmentation. It appears that this concept of collective or cooperative management, reducing the number of agencies when possible, will be the least disruptive to existing state agencies and the most effective.

One function of the areawide plan is designation of the agency or agencies charged with the responsibility for the construction, operation and maintenance of treatment works. It is this function which normally is assigned to the local municipality or sanitary district although it might be a state level agency as provided in such states as New York, Maryland, and Minnesota. In assigning this function to a local agency, the legal constraints on such an agency operating outside the area in which it has jurisdiction must always be observed. Many municipalities and sanitary districts are limited to specific geographical areas in which they can operate.

In determining whether the grant applicant complies with §208 (c)(2)(A) -- i.e., it is authorized to carry out "appropriate portions" of the areawide plan -- both the legal constraints and geographical limitations of the agencies to which functions are assigned in the areawide plan must be noted and observed.

Authority to Manage Effectively Waste Treatment Works -- §208 (c)(2)(B)

§208(c)(2)(B) requires that the management agency must have adequate authority to manage effectively waste treatment works and related facilities in conformance with the areawide plan. The broad definition of treatment works as set forth in §212(b) must be kept in mind. If the treatment works is more than the conventional end-of-the-pipe treatment plant, then the authority of the management agency must be considered in this context. This need for adequate authority to manage effectively does not, however, appear to present legal problems as much as practical management problems. The review of state laws does not indicate any legal constraints on the ability to manage effectively except as are considered when reviewing the implications of §§208(c)(2)(C) through (I). These sections are more specific as to the required authorities or powers of the waste treatment management agency. If the waste treatment management agency, either alone or in conjunction with other agencies, meets the specific requirements of §§208(c)(2)(C) through (I), then there appear to be no legal constraints which impair the ability or authority of the agency to manage effectively the waste treatment works. This requirement alone does not, therefore, pose any significant legal problems for the waste treatment management agency.

Authority to Construct and Operate Treatment Works Required by the Areawide Plan -- §208(c)(2)(C).

§208(c)(2)(C) requires that the waste treatment management agency must have adequate authority, directly or by contract, to design and construct new works, and to operate and maintain new and existing works as required by any areawide plan developed pursuant to §208(b). Most waste treatment management agencies whose function is wholly, or in part, operation of treatment works have such authority. It is one of the functions which are uniformly granted by state law to municipalities, sanitary districts or whatever agency is charged with the treatment function under state law.

One possible problem looms if the areawide plan calls for the agency to operate a treatment works which is located beyond its jurisdiction or to accept discharges from beyond such jurisdiction: for example, where a municipality is the management agency involved and its jurisdiction is limited to its corporate boundaries. This relates closely to the requirement of §208(c)(2)(A) with respect to the management agency having adequate authority to carry out appropriate portions of the areawide management plan when "appropriate portions" refers not only to functional portions, but to geographic portions. This problem can be avoided by cautious planning, but cautious planning may not be good planning. If good planning calls for an agency to operate beyond its jurisdiction, remedial legislation may be necessary. As an alternative to remedial legislation, the treatment agency may agree with entities beyond the agency's jurisdiction to accept discharges for treatment. The jurisdiction of the treatment agency is, in effect, extended by operation of the agreement. Such voluntary agreements between or among political entities are generally authorized by state laws such as interlocal cooperation acts.

Another problem of minor scope may be encountered if authorization or permission to construct and operate a treatment works is required from a legislative body or superior administrative agency. If this is the situation, the required authorization or permission should be secured before a grant application is made, and proof thereof should be submitted with the application. This would eliminate the legal problem, if any.

Authority to Accept and Utilize Grants from Any Source -- §208 (c)(2)(D)

§208(c)(2)(D) requires that the waste treatment management agency have adequate authority to accept and utilize grants, or other funds from any source, for waste treatment management purposes. Most waste treatment management agencies have the authority, either express or implied by state statute, to receive grants. This is particularly true of federal grants which are expressly named in such statutes. In some states, however, there is no legislation with respect to the receipt of grants, and in still others all grants are received by a state or regional agency which in turn distributes the monies from the grants to waste treatment management agencies. If state laws require grants to be received only by a centralized agency which has authority or discretion over subsequent distribution, a significant legal problem is posed which may require remedial legislation. As an example, under the so-called "Delaware system" all federal grants were received by a state agency for designated projects for which application had been made. The state agency had the authority to redistribute the total funds received not only to the approved projects, but to other projects as well. This, in effect, stretched the federal grant money, but required local agencies (municipalities, etc.) to pay a bigger share of the cost. Under the Act, state agencies may not divert funds or apportion funds so that an approved project receives less than the full federal funding to which it is entitled. Although it can be argued that such apportionment will stretch the allocation received by the state and finance more projects, such procedure is not permitted under the Act.

In nearly all states, however, the problem of receipt of grants by a centralized agency can easily be overcome by providing in the areawide plan, or state level plan under §303 (e), that the centralized agency is merely a conduit or an auditor, and that acceptance and utilization is, in fact, by the waste treatment management agency. This should not, however, be confused with the state level agency's duty to establish priorities for projects within the state as required by §§303(e) and 204(a).

The terms of the grant will require that the grant funds go to the waste treatment management agency (grant applicant). The grant terms control as a contractual obligation, and grant funds cannot be diverted from the purposes set forth in the approved grant application.

As a further assurance that grant funds will only be used in conformity with an areawide plan and by an approved (accepted) waste treatment management agency, §208(d) provides that "the Administrator shall not make any grant for construction of a publicly owned treatment works under §201(g)(1) within such area except to such designated agency and for works in conformity with such plan (areawide plan)."

Authority to Raise Revenues, Including the Assessment of Waste Treatment Charges -- §208(c)(2)(E)

§208(c)(2)(E) requires that the waste treatment management agency have adequate authority to raise revenues, including the assessment of waste treatment charges. This does not, at first glance, appear to present any formidable legal problems. The raising of revenues and assessment of waste treatment charges are, however, further qualified by §§204(b)(1)(A) and (B) of the Act. These sections provide that the Administrator shall not approve any grant for a treatment works unless the applicant (a) has adopted or will adopt a system of charges ("user charges") to assure that each recipient of waste treatment services will pay its proportionate share of the cost of operation of any waste treatment services provided by the applicant, and (b) has made provision for full recovery from industrial users ("industrial cost recovery") of the federally funded portion of the construction cost of the treatment works attributed to treatment of such industrial users' wastes. These qualifications on the system of charges make it apparent that some existing and much used systems of charges will not meet the requirements of the Act in that such systems do not provide that users will pay their proportionate share of the costs of waste treatment services.

"User charges" are defined as charges levied by the agency operating the treatment works on recipients of waste treatment services for the total cost and operation of such works. User charges as envisioned by the Act do not include cost of construction, but do include replacement costs for equipment, etc., which are necessary during the service life of the treatment works.

In order for a system of "user charges" to assure that each recipient of services pays its proportionate share of treatment costs, the characteristics of the effluent discharged into the system by the user should be considered. Treatment works are generally designed with two basic criteria in mind: (i) hydraulic capacity -- i.e., volume of effluent to be treated and delivery flow rate, and (ii) constituent components of the effluent to be treated -- i.e., BOD, suspended solids, etc. If the effluent has high concentrations of BOD or suspended solids, it is likely to be more costly to treat than the same volume of effluent with lower concentrations although removal of a small concentration of pollutants from a large volume of effluents can also be costly. Thus the characteristics of the users' discharge -- volume, delivery flow rate (time pattern of discharge), BOD, suspended solids, toxicity, etc. -- should be considered in assessing waste treatment charges for such user. If this is not done, such user will probably not pay its proportionate share of treatment costs.

A system of charges based solely on volume of discharge or on the amount of water consumed on the premises of the user will not satisfy the charge system requirements of the Act. As noted in the Senate Report to §204 of the Act, "as a general rule, the volume and character of each discharge into a publicly owned system should form the basis of determining the rate at which each user should be required to pay." In some instances charges based on volume might satisfy the requirements of the Act if this basis of charge represented each user's, or category of user's, proportionate share. As an example, if a treatment works is geared for a certain volume and the characteristics of the discharge received have only a negligible effect on costs of treatment, a charge based on volume would represent the user's proportionate share. The volume only charge system should not be confused with a charge system in which different categories of users are charged different rates, but within categories it is proportioned on volume. In this situation, the differentiation in rates -- if properly computed based on cost of treatment of each category of users' discharge -- provides the basis for each category of user to pay its proportionate share of costs.

Other systems of charges which most likely will not comply include levies of assessments based on valuation of the property served or on its size (front-footage), and "flat-rate" charges (monthly, quarterly, etc.). It is apparent that these systems of charges are in no way connected with the cost or treatment, although the size (front-footage) basis might furnish an equitable basis for recovery of capital costs of the collection system. They are convenient and economical to administer, but it would be only coincidental if such systems would equitably distribute recovery of treatment costs among categories of users as required by the Act.

In some instances, particularly in large multi-industry areas, it may be argued that the cost of monitoring and assessing charges makes it unfeasible to employ any "user charge" system other than that based on volume. The argument is in apparent conflict with the Act which requires that each category of user will pay its proportionate share. The cost of monitoring and reporting can, and should be, borne by the user -- in this case, industry. Since a system of "user charges" can be established by categories, it appears that different rates for different categories of users could be established which would result in a system of "user charges" that would satisfy the requirements of the Act.

In some states, state level administrative or quasi-judicial agencies must approve rates or systems of charges even when imposed by publicly owned utilities such as sewer systems. Except for possible political problems, this constraint would not appear to detract materially from a waste treatment management agency's authority to assess "user charges" in conformance with the Act. This merely requires that the agency justify its "user charge" system before it will be approved.

In many states, there is no express statutory authority or mandate to assess "user charges" based on the cost of treatment or characteristics of effluent. In these states, there is only a statutory authority to charge for services or to assess reasonable charges for services. In such situations, it is reasonable to imply that this express general authority to charge includes the authority to charge categories of users for their proportionate share of treatment costs. In a few instances, the state statutes are such that such implication cannot reasonably be made. This occurs when it is provided in the state statute the specific method of charging -- e.g., ad valorem tax, assessment based on front-footage, etc.

In addition to recovery of treatment costs, §204(b)(1)(B) requires full recovery from industrial users of the federal portion of construction costs reasonably attributed to provide the treatment works required to treat such industrial user's discharges in the system. This requirement affects the waste management treatment agency's required authority to raise revenues and assess waste treatment charges, since the revenues and/or charges must include this recovery cost from industrial users ("industrial cost recovery").

It should be remembered that under the Federal Water Pollution Control Act in force prior to the 1972 Amendments, the Federal Water Pollution Control Agency had issued Regulations (18 CFR§601.34, June 1970) and Guidelines (October 1971) regarding an equitable system of cost recovery for treatment of waste waters from industrial users. The industrial costs to be recovered included both operating and maintenance expenses and amortization of capital costs attributable to treating industrial waste waters. What were formerly Regulations are now part of the Act. Methods of "industrial cost recovery" may be by a system of user charges, connection fees, license fees, or other techniques available under state or local law. Referring to "industrial cost recovery," the Senate Report to §204 of the Act comments that it "will presumably occur over a rather protracted period of time." Factors that might be considered in determining the rate of "pay-back" include the service life of the treatment works and/or the term of the debt incurred for the non-federally funded share. The amount of payback will be actual cost, or a share of cost, computed on a percentage of the treatment works total capacity used by the particular industry including any firm commitment for increased use by that industry. These factors will, of course, be set forth in regulations and guidelines to be issued by the Administrator.

Since the Act requires "industrial cost recovery," a question arises of how firm or enforceable must be the commitment of industry to repay. This is, of course, a matter of policy for the Administrator to determine. If only several large industries are involved, a contractual arrangement with each can easily be envisioned. With a large number of industries -- large and small in an urban industrial area -- such contractual arrangements may be impractical. The number may be so large that "industrial cost recovery" charges assessed with, or as a part of, user charges, and spread over a large base will suffice to assure complete cost recovery irrespective of some users discontinuing use of the system. This presents some interesting problems, however, since it would tend to favor large urban-industrial areas -- i.e., an industrial user that would be a large contributor in a small urban-industrial area might be considered, comparatively speaking, only a small contributor in a large urban-industrial area. In the case of the small area, a firm commitment would be required, while in the larger area this would not be necessary. This would appear to give the large area an advantage over the smaller area at least to the extent that the commitment to repay is a factor in industrial site selection.

Assessments on the property of industry being served or a permit fee permitting an industry to discharge into the system are other methods of industrial cost recovery. In any event, it would appear advisable that the states should provide that industry's rights to discharge into the system, whether paid for in lump-sum or spread out, be assignable and transferrable to other industries discharging into the same system. This would facilitate mobility of industry and encourage industry to use the system. On the other hand, the agency should have the right to reassign, with appropriate credits to the obligated industries, any unused right of such industries to discharge. In this manner, industrial growth in the area would not be stifled by lack of sewer services when such services are available due to unused capacity of treatment works.

There are very few instances of express state statutory authority enabling waste treatment management agencies to implement industrial cost recovery. Most state statutory authority is directed toward amortizing capital expenditures by charging all users. This may in some instances present legal problems if industry is singled out to repay its portion of the federally funded construction costs. Since the Act does not require that non-industrial users be exempt from cost recovery, a system for total cost recovery from all users of the system would comply with the Act provided industry's share is segregated and the required portion returned to the federal government as required by §204(b)(3).

In addition to legal considerations, the impact of the system of charges on the decision of industry (or categories of industries) as to treating their own wastes or discharging into the system cannot be overlooked. The decisions of industries will be based largely on which is more economical. This impact should be considered when developing an areawide plan for areas having substantial problems with industrial waste waters.

The acceptable systems of charges or methods of raising revenues which comply with the Act will vary depending on the type of treatment works and users being served. Irrespective of the system of charges or method of raising revenues adopted by a waste treatment management agency, the system or method, or a combination of the two, must assure that each category of user pays its proportionate share of treatment costs and must be within the legal capacity of the agency to implement.

Authority to Incur Short- and Long-Term Indebtedness -- §208(c)(2)(F)

§208(c)(2)(F) requires that the waste treatment management agency have adequate authority to incur short- and long-term indebtedness. In many instances this authority is necessary to enable the agency to pay its share of construction costs as required by §204(a)(4) of the Act. It should be noted also at this point that §12 (Environmental Financing) of the Act establishes the Environmental Financing Authority for the purpose of providing a market, if it is needed, for state or local bonds. Federal funds would be used to purchase such bonds.

Most state statutes provide adequate authority for agencies to incur indebtedness. There are procedures to be followed, limitations of amount which may not be exceeded and, in some instances, approvals by the electorate are required. Before a grant application is submitted, all of the necessary procedures should have been followed, all required approvals should have been secured, and all periods for referendum or appeal should have expired. In this manner, no question will exist as to the agency's ability to finance its portion of the costs of the project.

One prevalent type of short-term indebtedness is issuance of bond anticipation notes. This device generates funds when needed, and the notes can be repaid from long-term bonds. A similar short-term note could be utilized to be repaid from proceeds of the grant.

In the case of general obligation bonds, constitutional or statutory limitations based on a percentage of the value of taxable property are quite prevalent. These bonds backed by the full faith and credit of a municipality or political subdivision are, as a general rule, readily marketable. They are, however, more likely to be subject to approval by a vote of the electorate. General obligation bonds are usually issued by political subdivisions such as counties, cities or municipalities. Special agencies, not deemed to be the same as political subdivisions, in many instances do not have the authority to issue general obligation bonds since they are unable to pledge the general credit of the political subdivision of which they are a part.

In the case of revenue bonds, limitations on the amount that can be issued by an agency are much less prevalent. The necessity for voter approval is also less prevalent. The marketability of revenue bonds is generally not as strong as general obligation bonds. The latter is particularly true where revenues are uncertain, since the revenues are pledged to retire the debt.

In the case of revenue bond financing, the provisions of §§204 (b)(1)(B) and 204(b)(3) may cause problems. These sections when construed together require segregation of revenues recovered from industry in the amount of the federally funded portion of construction costs attributed to treating industry's wastes. Part of this repayment revenue must be retained by the agency for future expansion and reconstruction, and the balance must be returned to the Treasury of the United States. In the event of a shortage of revenues this could present a priority problem between revenue bondholders and the agency and/or the United States, unless the system of cost recovery is such that the "industrial cost recovery" funds are segregated from funds available to repay the locally funded indebtedness. Including the "industrial cost recovery" as part of a general "user charge" would prove troublesome although it might be very convenient to do so. In order that local agencies will have a ready and strong market for their revenue bonds, that part of the revenue from which such bonds may be repaid should be clearly segregated from the part earmarked as "industrial cost recovery."

Authority to Assure that Each Participating Community Pays Its Proportionate Share of Treatment Costs -- §208(c)(2)(G)

§208(c)(2)(G) requires that a waste treatment management agency have adequate authority to assure in the implementation of the areawide waste treatment management plan that each participating community pays its proportionate share of treatment costs. This section does not refer to categories of users or industries, but to participating communities paying their proportionate share. One apparent purpose of this authority is to discourage or prevent the use of federal funds to construct a treatment works, the operation of which would be unfair to one or more of the participating communities. This section is a further implementation of the declared purpose of the Act that the users of services pay for such services without subsidization from other users.

One legal problem is what is meant by "community." The very wording of the section -- "each participating commumity" -- implies that there must be two or more communities being served by the same waste treatment management agency. Thus, "community" takes on the legal significance of being more than a neighborhood or unofficial area within an incorporated political subdivision. It is, as a result, reasonable to assume that community means (i) a political subdivision (incorporated entity) of general jurisdiction and not merely an unofficial area within a political subdivision, or (ii) a well-defined unincorporated area outside a political subdivision. Community is also differentiated from municipality in that the latter may include sanitary districts and other political subdivisions of limited jurisdictions as compared with cities, villages, etc., which are political subdivisions having general jurisdiction and which could more appropriately be designated as communities. In any event, for the section to be applicable there must be more than one "community" involved -- i.e., the agency must be serving more than one community.

There are few, if any, state statutes directly on point with the requirements of this section, but there are very few impediments under state laws which would prevent communities joining together for purposes of being served by one waste treatment management agency. In some states communities can be required to join together if one or more are not able to provide adequate treatment services alone, and such agreements can provide for each to pay its proportionate share. The incentives to cooperate are the economies of scale and the availability of federal funds if the community is part of the areawide plan. Another "incentive" is the fact that the Administrator, or the state, as the case may be, may withhold permits to discharge as provided in §402 (National Pollutant Discharge Elimination System) unless the communities agree to cooperate.

One way to overcome the lack of statutory authority is to have as part of the areawide plan the requirement that each community pays its proportionate share. If the waste treatment management agency has authority to implement the plan, then it should have authority to require each participating community to pay its proportionate share as required by the plan.

This provision for assuring that each participating community pay its proportionate share is closely linked with the provision of the Act requiring that each category of user pay its proportionate share of treatment costs. Communities are composed of one or more categories of users. If each category of user is paying its proportionate share, then it would follow that there is a sound basis for arguing that each community as an entity is paying its proportionate share. This can be accomplished by adopting the same formula or system of charges for the same categories of users in each participating community. One possible problem in this approach is that, due to the location of the treatment works in relation to the communities being served, it may actually cost more to treat the wastes of a community further from the treatment works. This would occur, for example, where cost of treatment includes costs of operating pumping stations and maintenance of interceptor sewers, since these facilities are included in the definition of treatment works in §212(2)(B).

For one reason or another, communities joining together might agree that participating communities not share treatment costs proportionately or, as may be the case, not take into consideration costs of treatment when apportioning treatment costs. Each community might agree that all will be treated the same although the cost of treatment may vary among the participating communities. As another example, a community may not want the treatment works located within its boundaries, and such community might willingly agree to pay more than its proportionate share in order to accomplish this desire.

Barring coercion or unconscionable overreaching, it would seem reasonable that the division of treatment costs agreed to by participating communities should be deemed each community's "proportionate share."

Other problems may arise when more than one community is involved, e.g., at what point do participating communities surrender part of their autonomy? As an example, if a bond issue must be approved by the electorate, must the required majority in each participating community approve the issue or must it only be approved by a majority of the electorate collectively in all participating communities? To the extent that communities have power under state laws, such matters could be resolved in the agreement or the areawide plan. In some states, however, there are legal barriers to a community (political subdivision) agreeing to be bound by a vote of less than the required majority of its own electorate.

Authority to Refuse to Receive Any Wastes from Any Municipality Which Does Not Comply with the Areawide Plan -- §208 (c)(2)(H)

§208(c)(2)(H) requires that the waste treatment management agency have adequate authority to refuse to receive wastes from any municipality or subdivision thereof which does not comply with any provisions of the areawide plan. A literal interpretation or strict application of this authority would present legal and practical problems of great magnitude. Can a waste treatment management agency operating a treatment works serving several municipalities cutoff one or more municipalities in the event that such municipalities are not in total compliance with the areawide plan? In most situations, there would be no place for the untreated effluent to go except into streams, rivers or lakes. This would, of course, create substantial problems of water quality control and would be counterproductive. When it is recognized that thousands of residential users would be affected, and that hospitals, schools, and other similar users would have to cease operations, the strict application of this authority to refuse -- i.e., to "cutoff" service -- appears to be politically unrealistic and detrimental to existing water quality.

More realistic interpretations of this authority to refuse include the right to refuse service to certain users -- e.g., an industry or category of industries -- within the municipality, the right to deny additional "hook-ups" to the system so long as the noncompliance continues, and the right to impose fines, penalties, surcharges, or similar sanctions on the noncomplying community.

It must be noted that the noncompliance is not limited to violations in discharging into the system, but includes any noncompliance with the areawide plan. This greatly increases the power or leverage of the agency to accomplish overall water quality control and not merely control of effluents being treated. As an example, the areawide plan must provide for control of construction-related nonpoint sources of water pollution. If a municipality fails to control this source of pollution, it is in violation of the areawide plan, and the agency must have the authority to "refuse" to receive any wastes from such municipality.

One prevalent legal problem is that the agency charged with waste treatment -- i.e., operating the treatment works -- in many instances does not have the authority to refuse to receive any wastes, the authority to deny expansion, or the authority to impose other sanctions. As an example, the planning authority of the area usually determines land use and would have jurisdiction over a new residential subdivision or industrial park. To continue, the building commissioner or building department may have jurisdiction over issuing individual building permits. Thus, these two agencies could approve substantial new construction resulting in new sources of sewage. In some states these problems are overcome or avoided by having the treatment agency take part in the planning process and the building permit issuing process.

In the case of refusing wastes, this authority sometimes resides in a regulatory agency which may be separate from the agency operating the treatment works. Thus the regulatory agency has the authority to order the cessation of discharge into the system. These problems can be overcome by the two or more agencies working together, and the areawide plan should provide for such cooperation in order that this requirement of the Act can be satisfied without new legislation shifting authority to an agency operating a waste treatment plant.

If the noncompliance with the areawide plan is attributable to identifiable users within the municipality, the authority to cut-off these users should satisfy this requirement of the Act. This is particularly true with industrial users. In most states, waste treatment management agencies have this authority to refuse to receive wastes from a user who is not in compliance with pretreatment standards. If the noncompliance is unrelated to the discharge into the system, it is less certain that service can be denied, since few state laws address this problem specifically.

Construing the authority to refuse as including the authority to deny new or additional connections to the system presents other legal problems. This is particularly troublesome when the moratorium or refusal affects prospective users who are not responsible for, and have no way of correcting, the noncompliance. If noncompliance is existing, or will exist, due to overloading the capacity of the treatment works, it can be asserted and maintained that the denial of a permit to connect to the system is reasonable, although such prospective users may argue that it is the municipality's responsibility to provide treatment. If, however, the noncompliance is unrelated to the treatment of point source wastes -- e.g., the municipality is not in compliance with the areawide plan due to not controlling agricultural nonpoint sources of water pollution -- the moratorium penalizes prospective users not only who are free from any fault but whose use of the system will not adversely affect water quality control. The positive aspect in this situation is that, from the point of overall water quality control, this provision of the Act results in the municipality being pressured both externally and internally to come into compliance with the areawide plan.

If the right to refuse is construed to include the power to impose penalties or sanctions, fewer legal problems are encountered. This is particularly true if the noncompliance is in connection with discharge into the system. Penalties or surcharges can reasonably be assessed on the degree of noncompliance. The municipality could then assess users within the community who contribute to the problem of noncompliance. Penalties or surcharges for this type of noncompliance can, and in many instances are, assessed by the waste treatment agency. The legal justification for such penalties or surcharges includes the increased costs to the treatment agency resulting from the users' noncompliance. As an example, the volume or characteristics of the discharge into the system may be regulated. Violation of this regulation could result in increased costs to the treatment agency. If the regulations, penalties, and surcharges are reasonable and necessary to the operation of the treatment works, no legal problem should exist in their enforcement.

In the event that noncompliance is unrelated to discharges into the system, the penalty or sanctions on the municipality could not reasonably be based on, or measured by, the amount discharged into the system, except to the extent that it is deemed that the municipality is benefitting from treatment services in proportion to its volume of discharge into the system. In many states, the control and imposition of sanctions for violations not related to discharge into the system are imposed by agencies other than those operating the treatment works. These take the form of criminal penalties, and sometimes civil remedies, such as injunctions or damages. In imposing additional sanctions, such as cutting off service, it would have to be clear that the criminal sanctions are not the exclusive remedies -- i.e., there should be express legislative authority to this effect rather than relying on an implied authority based on an express authority to regulate. It bears repeating that the areawide plan must take into consideration these jurisdictional constraints when assigning functions to particular agencies.

Authority to Accept for Treatment Industrial Wastes -- §208(c)(2)(I)

§208(c)(2)(I) of the Act requires that the waste treatment management agency have adequate authority to accept for treatment industrial wastes. In some states this is specifically authorized by statute. In most, however, it can reasonably be implied from the express general authority to receive wastes for treatment.

This provision must be construed in conjunction with §208(b)(2)(C)(iii) which requires that the areawide plan include a regulatory program to assure that any industrial wastes discharged into a treatment works meet applicable pretreatment standards. The authority to accept such wastes is, therefore, qualified at least to the extent that such wastes must meet pretreatment requirements. Pretreatment requirements and restrictions on wastes discharged into the system are necessary in order to protect operation of the treatment works.

Pursuant to §307(b) of the Act, the Administration must publish regulations establishing pretreatment standards for introduction of pollutants into publicly owned treatment works which pollutants are determined not susceptible to treatment or which would interfere with the operation of such treatment works. This section of the Act does not prevent establishment of pretreatment standards by state or local laws not in conflict with the federal standards. Thus, under the Act, the treatment management agency has the right to refuse any effluent which violates federal, state, or local pretreatment standards or which would damage or disrupt its treatment works and thus endanger water quality.

The authority to monitor discharges into the system is implicit in provisions of the Act including the provision for authority to charge users for their proportionate share of treatment costs. Assessment of charges would in most instances require monitoring if it were to be done equitably -- i.e., each category of user pay its proportionate share of costs of treatment.

In addition, §308 (Inspections, Monitoring, and Entry) of the Act expressly requires monitoring and reporting by owners of any point source of effluent to carry out the objectives of the Act which include developing and enforcing of pre-treatment standards. This, coupled with the broad definition of "point source" in §502(14), makes it clear that monitoring of industrial wastes is authorized and, in effect, required under the Act. Each state is authorized to implement its own system of monitoring and reporting provided that such state system is equivalent to that required under §308.

Considering the interrelated provisions of the Act, not only must the waste treatment management agency have authority to accept industrial wastes for treatment, it must also have the authority to refuse industrial wastes (i) when pretreatment standards of the agency are not met, (ii) when such industry is not otherwise in compliance with the areawide plan, or (iii) when applicable state and federal laws related to discharge by such industry are being violated.

With respect to treating industrial wastes, a possible legal problem may arise if a publicly-owned treatment works is constructed primarily, or solely, for this purpose. This might be construed as the use of public funds to benefit private industrial users. Such a problem can be avoided if the industrial users served are required not only to pay their proportionate share of treatment costs and the federally funded share of capital costs, but to repay all of industry's proportionate share of capital costs. In most situations involving funding of the local share by revenue bonds, this presents no problem, since the charge system will include amounts to retire the debt. In case the local funding is by general obligation bonds, some method of recovery from industry for the local's share of capital costs should be devised.

SUMMARY

In reviewing state laws in the light of §208(c)(2) of the Act, and the "adequate authority" required of waste treatment management agencies, several of the requirements of §208(c)(2) appear more likely to pose legal problems for waste treatment agencies than others. These problem areas include adequate authority (i) to assess waste treatment charges ("user charges") based on the user's proportionate share of treatment costs, (ii) to assess charges or raise revenues to recover from industrial users the federal portion of construction costs of the treatment works attributed to treating such industry's wastes ("industrial cost recovery"), (iii) to assure that each participating community pay its proportionate share of treatment costs, and (iv) to refuse to receive any wastes from a municipality or subdivision thereof which does not comply with any provision of an approved areawide plan.

The required authority to raise revenues and assess water treatment charges appears rather straightforward and generally free from legal problems. When combined, however, with the provision that each category of user will pay its proportionate share of treatment costs, many existing systems and methods of charging users become suspect as not meeting this requirement. Such systems or methods are not related to cost of treatment of the wastes of a particular category of users. In many states, there is no more than a general authority to charge for services with no requirements that it be based on, or in any way related to, treatment costs. Thus, a change in the system of charges to comply with the Act may not be authorized by state statute.

The required authority to recover from industrial users the federal portion of construction costs attributed to treatment of such industrial wastes ("industrial cost recovery") encounters the same lack of express statutory authority as does the requirement to charge users for their proportionate share of treatment costs. Even in states in which there are express provisions authorizing charge systems based on recovery of treatment costs, nothing is expressed regarding recovery of grant funds. This authority must, therefore, be implied from other powers and authorities of the agency. In the event of a shortage of revenue, the legal problems of priority between the federal government and waste treatment management agency (as trustee of earmarked funds) on one side, and revenue bond holders on the other is also presented unless the funds are clearly segregated.

The required authority to assure that each participating community pay its proportionate share of treatment costs is troublesome when participating communities agree among themselves on a division of charges which does not provide that each pay its proportionate share. In other words, how is an agency going to impose an equitable system of charges on a community-by-community basis if the communities voluntarily agree otherwise. As an example, one or more communities may not voluntarily join an areawide system unless all communities are treated equally even though the cost of treating sewage from such communities is more than other participating communities. It is suggested that what is equitable or proportionate as among communities who enter into such agreements should be that to which they agree openly and voluntarily.

Probably the most legally troublesome provision is the required authority to refuse to receive any wastes from any municipality which does not comply with any provisions of the approved areawide plan. The practical impossibility or unlikelihood of a waste treatment management agency refusing waste waters from a community that it is already serving is obvious. The legal problem exists as to what lesser sanctions can be imposed that will still satisfy this requirement of the Act. In considering lesser sanctions, a further legal problem is encountered, and that is whether the agency has legal capacity to impose lesser sanctions such as a moratorium on new "hook-ups" or a monetary penalty.

As noted in the introduction to this section, a waste treatment management agency should not rely too heavily on its general powers to receive grants and to contract with the federal government as a basis for its "adequate authority" to perform as required by §208(c)(2). This reliance results in uncertainties until the judicial system resolves them. It is suggested that legislation granting express authority is the safer and better route to follow.

SECTION IV

NOTES

1. Ohio Const. art. XVIII, §7; Pennsylvania Const. art. IX, §2; See also I Aniteau, Municipal Corporation Law §3.00 et seq. (1968).

2. Minnetonka Elec. Co. v. Golden Valley, 273 Minn. 301, 141 N.W.2d 138, 140 (1966) ("It is clear that municipalities have no inherent powers and possess only such powers as are expressly conferred by statute or implied as necessary in aid of those powers which have been expressly conferred." See I Aniteau, Municipal Corporation Law §5.01 (1968).

3. I Sutherland, Statutes and Statutory Construction §4.07 (4 ed. by C. Dallas Sands, 1972).

4. See 15 McQuillin, Municipal Corporations §43.19 (3rd ed. 1970) ("As inherent power to issue does not exist, a municipality may issue bonds only when duly empowered. At present it is the law in most of the states and in the Supreme Court of the United States, that municipal corporations have no power to issue bonds unless expressly authorized to do so, or perhaps where there is an absolute necessity therefore to carry out other powers expressly conferred upon the municipality; and the power cannot be implied from the ordinary police powers conferred upon municipalities. However, the earlier cases in the federal courts were to the contrary, and even at present implied power to issue is recognized in some states. Some decisions have held that the express power conferred on a municipality to purchase property or erect buildings carries with it the power to issue bonds for the cost, and that is the law today, it seems, in some states, although the weight of authority and the tendency of the later decisions is the contrary.")

5. Gordon v. Fairfax County, 207 Va. 827, 153 S.E.2d 270, 274 (1967) ("The conflicting decisions as to what powers are necessarily implied from particular expressed powers indicate that there is no special test to determine this question.")

6. Beazley v. DeKalb County 210 Ga. 41, 77 S.E.2d 740, 742, (1953) ("Municipal corporations can exercise only such powers as are conferred on them by law, and a grant of power to such corporations must be strictly construed;

and such corporation can exercise no powers except such as are expressly given or are necessarily implied from express grant of other powers, and if there is a reasonable doubt of the existence of a particular power, the doubt is to be resolved in the negative."); Green v. Milledgeville 112 Ga. App. 130, 144 S.E.2d 225 (1965). ("A municipality is confined to the exercise of powers expressly granted or necessarily implied, and a necessary implication must be so clear and strong as to render highly improbable that the legislature could have entertained an intention contrary to such implication."); see 13 McQuillin, Municipal Corporations §37.24 (3rd ed. 1971).

7. 1 Cooper, State Administrative Law, 90-91 (1965). See also I Sutherland, Statutes and Statutory Construction §4.07 (4th ed. by C. Dallas Sands, 1972).

8. Bortz Coal Co. v. Air Pollution Comm., 2 Pa. Com. 441, 279 A.2d 388 (1971); Dept. of Health v. Owens-Corning Fiberglass Corp., 100 N.J. Super 366, 242 A.2d 21 (1968).

9. Goreham v. Des Moines Metropolitan Area Solid Waste Agency, 179 N.W.2d 449 (Iowa S. Ct. 1970).

SECTION V

REVIEW OF MANAGEMENT PROBLEM AREAS OF SELECTED WATER QUALITY MANAGEMENT AGENCIES IN COMPLYING WITH §208(c)(2) OF THE ACT.

This section of the report opens with a perspective on federal policy in the field of water quality management and then provides a background discussion of the areawide approach before turning to its primary objective -- a review of management problems of selected water quality management agencies.

FEDERAL POLICY PERSPECTIVE

Two principal approaches seem to run through federal legislation dealing with water pollution control since the first permanent national legislation was passed in 1956. These are: (1) financial assistance, coupled with (2) enforcement of the "carrot and stick" approach. The enforcement approach has always been directed toward individual sources of waste discharges and, over the years since 1956, authority under federal legislation has been expanded to the point where virtually all of the sources of pollution, whether interstate or intrastate, are subject to federal enforcement powers, in principle. The Water Pollution Control Act of 1965 attempted to strengthen substantially the federal enforcement mechanism by requiring that all states set water quality standards on their interstate and boundary waters. These standards were to be reviewed and approved by the Secretary of the Interior. The state-proposed standards were to be accompanied by a proposed program for achieving them. This set of programs would serve as a basis against which to assess federal enforcement actions. The approach used in 1965 legislation was that of setting water quality standards or ambient standards. The Federal Water Pollution Control Act of 1972 continues to emphasize enforcement but has linked it to point-source effluent standards coupled with water quality standards. Hence, a new dimension has been provided by the Act.

The second basic approach of federal legislation is that of financial support for waste treatment plant construction. This program began with the Federal Water Pollution Control Act of 1965 and has continued under ever-increasing levels of authorized grants since that time. Table 1 illustrates the magnitude of authorizations for this particular program. Illustrative of the levels of authorizations under the 1966 Act was that which authorized $3.4 billion for municipal wastewater construction grants. However, only $2.2 billion was appropriated and actual expenditures have run well below this. Under this Act, it was possible for municipalities to obtain up to 55 percent of the cost of waste treatment plant construction from federal grants. By comparison, the Act provides 75 percent funding from the federal government.

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TABLE 1

KEY FEDERAL WATER POLLUTION CONTROL LEGISLATION

Title	Key Provisions		
	Financial	Enforcement	Other
Rivers and Harbors Act Amendments of 1899		Provides for injunctive relief to halt pollution. Seldom enforced. Dumping permissible only with a permit from Corps of Engineers. Fines of $500-$2500, or imprisonment for 30 days-one year, or both. Offers a bounty of one-half of fines collected to persons giving information which leads to conviction.	Forbids all pollution discharges except liquid municipal wastes. Very complex implementation. Covers navigable waters or their tributaries.
Water Pollution Control Act of 1948 (P.L. 80-845)	Loans for building sewers. Temporary appropriations $3 million in 1950 to less than $1 million in 1955.	Primary reliance on the states. Six step procedure with enforcement dependent upon state agency consenting thereto. Very ineffective.	Establishment of Water Pollution Control Division of Public Health Service. Expired in 1956.

TABLE 1 (cont'd)

Title	Key Provisions		
	Financial	Enforcement	Other
Water Pollution Control Act Amendments of 1956 (P.L. 84-660)	Matching grants for waste treatment plant construction. $50 million annual authorization. Funds consistently vetoed by President.	Enforcement by conference-hearing-court action for interstate waters. Conference is called by Secretary of the Interior when he has reason to believe water pollution is crossing state lines. Conference is attended by appropriate state water pollution authorities. Those contributing to or affected by the pollution may recommend remedial action to the state authorities, but he may take no further enforcement action for six months. Next step is a public hearing by a hearing board appointed by the Secretary. If board determines that pollution is occurring, it may recommend (cont'd)	

TABLE 1 (cont'd)

Title	Key Provisions		
	Financial	Enforcement	Other
		that the Secretary order abatement within a reasonable time (no less than 6 mos.). Finally, Secretary may ask the Justice Dept. to bring an action.	
Water Pollution Control Act Amendments of 1961. (P.L. 87-88)	Funding authority of $80 million in 1962, $90 million in 1963, and $100 million annually from 1964-67.	Federal jurisdiction extended to all "navigable or interstate" waters. Enforcement responsibility transferred from Surgeon General to Secretary of HEW.	Established laboratories for water pollution studies.
Water Quality Act of 1965 (P.L. 89-234)	Funding authority of $150 million in 1966-67. First project grants for research and development on combined sewers. Matching grants for planning.	States required to follow Federal guidelines and develop stream quality standards. Created Federal Water Pollution Control Authority (FWPCA) in HEW.	States also required to develop implementation plans to control the effluents discharged into these waters in order to reach the stream quality goals expressed as standards.

TABLE 1 (cont'd)

Title	Key Provisions		
	Financial	Enforcement	Other
Clean Water Restoration Act of 1966 (P.L. 89-753)	Funding authority of $450 million in 1968, $700 million in 1969, $1 billion in 1970, and $1.25 billion in 1971. Federal percentage of construction costs up to 55 percent.	Use of federal enforcement to abate pollution of international boundary waters.	Establishment of Water Resources Council. First grants for research and development of industrial waste treatment and advanced waste treatment generally 90 percent of all funds for construction of municipal waste treatment plants.
National Environmental Policy Act of 1969 (NEPA)	$1 million per year authorized for every year after 1971.	All agencies of the federal government must consider environmental values in the opertion of their program. Must prepare an environmental impact statement for every major decision.	Statement of national policy concerning environmental values and creation of Council on Environmental Quality (CEQ) to protect these values.
Water Quality Improvement Act of 1970 (P.L. 91-224)	Authorized $35 million total for implementation.	States are still the primary enforcers of water quality standards. If they fail to act, the (cont'd)	Repealed 1924 Oil Pollution Act. Brought oil and some other pollutants under better control. Studies in eutrophication (cont'd)

TABLE 1 (cont'd)

Title	Key Provisions		
	Financial	Enforcement	Other
		Secretary of the Interior may then set standards and enforce them.	and acid mine drainage.
Environmental Quality Improvement Act of 1970	Additional funding for NEPA. Authorizes $1.5 million for fiscal 1972.		Provides an administrative framework for NEPA. Creates the Office of Environmental Quality as a staff agency for the Council on Environmental Quality.
Water Pollution Control Act Amendments of 1972	Total authorization is $27 billion, $20 billion for construction of waste treatment works. Federal share of treatment plant construction goes to 75 percent.	Allows citizen suits to enforce standards. Calls for mandatory use of "best available technology" in new plants.	Based on emission control instead of water quality standards. Calls for zero discharge of pollutants by 1985. Broadens the definition of "navigable" waters.

Words and terms must be defined in practice before real meaning emerges. It is clear from the record that waste treatment facilities have been the keystone in federal water pollution control strategies. The traditional notion of wastewater treatment management, then, has been to build physical facilities for treating liquid waste. To put it another way, it is the implementation of the utility approach, or the "end of the pipe" philosophy. One simply determines through analysis and forecast[1] the expected load (load as measured by volume and quality of the wastewaters to be treated and the type of residuals to be handled) and then builds facilities -- pipelines and treatment plants that are large enough to accommodate this load. On the other hand, another set of words -- water quality management -- connotes a more current approach which includes an examination of a full range of alternatives -- technological and administrative -- and their costs and benefits. If we take as our primary objective the improvement of the quality of the receiving waters, then it is reasonable to suggest that there are two general approaches to managing liquid wastes. One is to seek methods for reducing waste discharges; the second is developing methods for increasing or making better use of the assimilative capacity of the stream[2]. Table 2 provides further information regarding these two basic approaches[3].

An analysis of the full range of alternatives required to implement these approaches comprises the concept of water quality management as defined and used in this report.

One can get a flavor of the Act's intent by examining selected language within it, the sections in the Committee Report on Senate Bill 2770, and the Conference Committee Report as well as speeches by members of Congress. Illustrative of the breadth of purpose incorporated into this bill, if the intent of Congress is faithfully transmitted by Congressman Blatnik's views, is the following quotation from a speech delivered on November 27, 1972 to the Interstate Conference on Water Problems in Austin, Texas. Congressman Blatnik said: "We have been talking for generations about river basin planning; everyone who has been talking for generations about river basin planning; everyone who has been involved in water resources problems recognized long ago that individual project planning is futile without a total basin plan that takes into account both the quality and the multiple demands on all the waters within a river basin. We hope to achieve that kind of planning because nothing else seems to make sense[4]." A further indication of Congressional intent regarding this bill may be found in the Senate Report to §201:

> The committee emphasizes that the policy in Section 201, read with the policy stated in Section 101,

TABLE 2

METHODS FOR IMPROVING THE QUALITY OF RECEIVING WATERS

I. METHODS FOR REDUCING WASTE DISCHARGES

   A. Methods for Reducing Waste Generation

      1. Change in type of raw material inputs.

      2. Change in production process.

      3. Change in product outputs.

      4. In plant recirculation of water.

   B. Methods for Reducing Waste After Generation

      1. Materials recovery.

      2. By-product production.

      3. Waste treatment.

      4. Effluent reuse (including ground water recharge, wastewater reclamation or renovation).

II. METHODS FOR INCREASING OR MAKING BETTER USE OF ASSIMILATIVE CAPACITY

      1. Addition of dilution water.

      2. Multiple outlets from reservoirs.

      3. Reservoir mixing.

      4. Aeration of streams.

      5. Salt water barriers.

      6. Effluent redistribution (including regulated discharge).

> requires the administrator to direct his research and development authority under Sections 104 and 105 to carry out those policies. This statement of policy coupled with a requirement to consider alternatives as a condition to federal assistance is intended to overcome the resistance and lethargy present in many planners in the federal agency, state agencies, and in private consulting firms. Planning must move beyond its present orientation to truly integrative and ecologically sound systems. It is expected that the administrator will give close supervision to this effort in order to develop integrative and comprehensive waste management systems and technology. The administrator must press the development of technology and do it within the framework of ecological principles so that sound systems are developed[5]. (Emphasis added.)

Two significant indicators are available which suggest possible reasons for inadequate attempts to implement policy in the past, first by the Water Pollution Control Administration under the Department of Health, Education and Welfare (HEW), later under the Department of Interior, and now under the Environmental Protection Agency: (1) Allocation of federal funds under the grants program has been largely arbitrary from an economic efficiency standpoint. Since state programs are allocated funds according to a formula based on state per capita income and population. The results have been that funds have been generously provided in some states and very limited provision has been made in others. One of the consequences of this approach is that we have a situation in this country where fully one-quarter of the metropolitan area waste treatment capacity is less than half utilized and nearly 20 percent is overloaded[6]; (2) Another shortcoming of the grants program, resulting from its over-emphasis on construction of treatment plants, is the virtual absence of an appropriate mechanism to assure effective operation of the plants once they have been built[7]. Financial assistance that provides for only capital costs leaves the local governments the problem of bearing the maintenance and the operating costs. These are substantial and when examined over the life of the plant, they are often greater than the initial capital investment.

One general conclusion to be drawn is that there is an inclination to rely upon an "end of the pipe" philosophy -- one which may overlook the many advantages of alternative approaches to simply constructing more and larger treatment plants.

BACKGROUND - THE AREAWIDE APPROACH

One of the underlying and fundamental problems which had been identified as a restraint to effective water quality management is the limited political and geographical jurisdiction of the typical wastewater management agency[8]. The nature of water pollution is fundamentally one of a hydrological problem area which usually extends beyond traditional political boundaries -- state, region, county, municipality, special district, or river basin (current use of river basins as pollution control areas is the closest approximation to a problemshed area). The basis for the areawide approach to water quality management is that of enlarging the jurisdiction of an administrative organization charged with wastewater management to allow it to deal with either a whole problem or with as much of one as is feasible.

In order to effectively manage the problems of extensive and increasing pollution in the nation's waterways, a means for internalizing the external costs is necessary. This suggests a more comprehensive, systematic view of wastewater management in order that both the public organization and the individual polluter may deal with the totality of wastewater problems. This systems approach has evolved in recent years in the discussions of the total interrelatedness of society and the natural environment -- the biosphere -- upon which man and society depend for all life support elements. Thus, with regard to water quality problems, an areawide problem area which permits a geographic approach to the physical problem of improving water quality within a problemshed must now be transformed into political and administrative terms. Thus, while the problem is, on first glance, a technical one, it is clear that the legal authority, political support and management capability necessary to deal with areawide problems must be obtained before the areawide approach called for in the Act can achieve its framers' intent.

Among the examples of the type of institutional arrangements called for above are three metropolitan agencies which were the subject of on-site examinations for this study. These are the Seattle Metro organization, the Metropolitan Sewer Board (MSB) of the Minneapolis-St. Paul Twin Cities area, and the Metropolitan Sanitary District of Greater Chicago (MSDGC). Each has undertaken an areawide approach to wastewater management which extends service areas across county and municipal boundaries. Seattle extends over two counties, MSB of the Twin Cities over seven counties, and MSDGC serves essentially all of Cook County.

Another example, organized on the basis of a hydrologic unit, is the Gulf Coast Waste Disposal Authority (GCWDA). Created by the Texas Legislature in 1969, the GCWDA was given jurisdiction throughout the three county area encircling Galveston Bay. At present, it is seeking to halt the proliferation of small, inefficient and quickly outmoded waste treatment plants through a two-stage evolution: subregional plants, then a regional plant. Once this is fully implemented, it will provide adequate authority for instituting a monitoring and water quality management program that can achieve improved water quality in the Houston Ship Channel and Galveston Bay[9].

In an effort to provide assistance to the development of guidelines to be issued by the EPA for the implementation of §208(c)(2) of the Act, a survey was conducted of a broad range of present wastewater management organizations and their approaches to their particular water quality problems. This survey examined a selected group of existing management organizations in order to describe and identify administrative and technical problem areas that may emerge in the reorganization or conversion of management agencies in accordance with the provisions of §208(c)(2). In particular, metropolitan wastewater agencies situated in major urban-industrial concentration locations were selected for review. These relatively sophisticated agencies have implemented wastewater programs in a manner approximating an areawide problem concept. This analysis will review the legal, organizational, fiscal, and political problems of establishing areawide water quality management agencies and integrating them with other components of local or regional governments. Each case represents a different set of water quality problems, a different range of service areas and formal jurisdictions, and a different degree of success in meeting the wastewater management problems of urban-industrial areas, river basins, and multi-county areas within a state. While each set of problems were different -- Lake Washington, the Mississippi River below Minneapolis-St. Paul, Metropolitan Chicago waterways, the Delaware River in three states, the Miami River Basin in Ohio, and the diverse wastewater situations across Maryland -- the criteria for effective management in each instance were generally the same. The discussion of each organizational arrangement in this section provides additional examples of how the selected agency responded to its mandate and the problems it faced.

Current institutional arrangements, the programs and their administrative procedures are discussed on the basis of four areal criteria: (a) less than areawide, (b) areawide, (c) basinwide, and (d) statewide. In addition, when more than one agency fit these categories, the particular activities of each are examined in order to bring to light the different approaches now in use.

Specific objectives sought in this survey of management agencies include the identification and description of the agency, the geographical and demographic situation, the nature of the wastewater sources prevalent in the area or region, and the dynamic characteristics of the administrative process which have led to effective performance.

The effectiveness of such institutional arrangements is determined primarily by the objectives of each organization. In the Twin Cities MSB case, this is the management (i.e., "the collection, treatment and disposal of sewage in the metropolitan area") of all wastewater facilities of the Twin Cities Area, a seven county area governed by the Metropolitan Council. The Metro Seattle is a metropolitan municipal corporation which has the specific function of sewage disposal in the 300 square mile Seattle Standard Metropolitan Statistical Area (SMSA), consisting of 11 cities, 18 sewer districts, and one private agency. The Metropolitan Sanitary District of Greater Chicago has responsibilities for collecting and disposing of sewage, controlling floods and protecting the water supply of an 860 square mile area from pollution. Its service area includes the City of Chicago and 117 surrounding communities. The Delaware River Basin Commission (DRBC) defines its objective as the planning, conservation, utilization, development, management and control of the water resources of the Delaware River Basin, extending from the southern Catskills in New York to Delaware Bay. A mission similar to the DRBC is that of the Miami (Ohio) Conservancy District which, although primarily concerned with flood control and water supply, has undertaken a broader goal of maintaining water quality throughout the Miami River Basin. A final example of areawide objectives is the Maryland Environmental Service (MES), a public corporation of the State, which provides liquid and solid waste management services to counties, municipalities, state agencies and industrial plants. Its primary concern is the regionalized management of liquid and solid wastes in all areas of the State. While it serves as a wholesaler of collection and disposal facilities, the MES must also meet standards set by other state agencies for state waterways, in order to maintain stream quality standards now in force. The MES is new and so has not yet established a track record. It is an innovative management arrangement and as such warrents observation by and encouragement from the EPA.

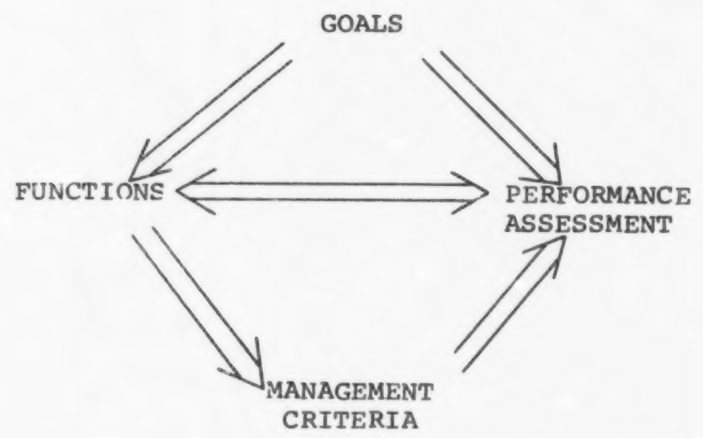
REVIEW OF SELECTED WATER MANAGEMENT AGENCIES

The survey of existing management agencies responsible for implementing water quality programs was concerned with the structure and organization, the formal authority and activities, and the relationships of these agencies to the general public and state and local government. The purpose of this analysis of existing agencies is, therefore, the description of the manner in which wastewater management agencies function and the identification of the operating problems with which these agencies must cope. Figure V-1 diagrams the interrelationship between the management activities applied to the subject agencies.

The sample of agencies chosen for case studies in this report were selected from a larger list of organizations in state, local and interstate categories. The five selected for detailed study were chosen on the basis of conformance with one of four areal categories: (1) less than areawide, (2) areawide (SMSA), (3) basinwide, and (4) statewide. Areawide has been defined in the preceding discussion as a Standard Metropolitan Statistical Area (SMSA). The other classifications are briefly defined below:

> Less than areawide -- A geographical/political designation which comprises one or more local governmental units over an area which is smaller than and lying within a SMSA.
>
> Basinwide -- A service area which incorporates all streams and waterways which culminate in a major river basin, regardless of local or state political boundaries.
>
> Statewide -- A service area of all waterways lying within and on the edge of any of the states in the United States, including coastal waterways and inland lakes which may form part of the state line.

The agencies examined were selected as representatives of the four areal categories or classifications. While there are other agencies which might provide part or all of the type of information sought, the organizations chosen illustrate the more sophisticated and progressive management arrangements currently in existence. Thus, as examples of less than areawide wastewater management agencies, those from Metropolitan Seattle, Washington and the Metropolitan Sanitary District of Greater Chicago were used. For an agency which serviced an area conforming or nearly conforming to a Standard Metropolitan Statistical Area, the Metropolitan Sewer Board of the Twin Cities of Minneapolis-St. Paul, Minnesota was chosen. As examples of basinwide organizations, i.e., river basins within states and river basins which extended across state lines, the Miami (Ohio) Conservancy District and the Delaware River Basin Commission were selected. Finally, one of the few management agencies now in existence with full statewide jurisdiction coupled with authority to operate at the level of local government, e.g., counties, the Maryland Environmental Service was chosen for detailed assessment.


GOALS
FUNCTIONS
PERFORMANCE ASSESSMENT
MANAGEMENT CRITERIA

ANALYSIS OF AREAWIDE
WASTEWATER MANAGEMENT
ACTIVITIES

FIGURE V-1

In order to better understand how each of these operating agencies carry out the general activities of planning, design and construction, operations, and regulation, four general assessment criteria were applied: ability to generate information; ability to provide adequate representation; efficiency; and effectiveness.

While the problems which might be identified are very specific in most cases, they often are the result of a set of activities which have been identified as basic to water quality management. These include: (1) the authority to plan for all physically related parts of one or more drainage areas, (2) responsibility for providing wastewater treatment facilities wherever needed, (3) authority to finance all water quality facilities construction and operation, and (4) the ability to provide for public participation in both policy planning and management decision-making. Kneese and Bower have identified another set of activities fundamental to achieving efficient water quality management[10]. These include: the ability to analyze and implement a wide range of alternative methods; the authority and capability to influence the patterns of land use in relation to water quality management; the implementation of both private and local government decisions through operation and regulation; and the development of methods for internalizing the external costs imposed on wastewater plants by both industrial and municipal discharges.

These two views of activities are seen as necessary to achieve the broader set of goals and objectives which have evolved in the development of the areawide approach to wastewater management. These goals include the need to (1) avoid duplicative and overlapping facilities, e.g., pipes, treatment plants, and related equipment for the same drainage areas; (2) establish countywide, contractual, or joint facilities, or to create special districts or "metro authorities;" (3) achieve joint ownership of waste treatment facilities wherever necessary or desirable; and (4) arrive at flexible financing arrangements. On the other hand, studies[11] have identified constraints to achieving these goals and objectives such as: (a) whether emphasis on effluent discharge control alone results in a specific level of water quality; (b) problems of limited technical expertise and shortages of qualified personnel; and (c) geographical limits on enforcement and service area jurisdiction.

A set of more detailed measures were utilized in the examination of the past experience, while present capabilities of each organization were drawn from various recent studies of water quality management[12][13]. The parameters for assessing a wastewater management organization discussed in these sources include:

1. Harmony of area and activity
2. Population base
3. Program's scope and depth
4. Legal authorization
5. Fiscal adequacy
6. Accountability
7. Flexibility
8. Structural compatibility
9. Contemporaneousness
10. Political viability
11. Organization structure
12. Intergovernmental linkages
13. Enforcement activities

These parameters provide a means to assess each agency on the following aspects of their performance: (a) the internal and external structure of the organization including its functional activities, its areal jurisdiction, and the linkages utilized between and among other units of government; (b) the powers granted to the agency by state and/or municipal legislation; (c) the statement of the mission as perceived by each agency; and (d) the notion of responsibility of the agencies to state, local, and other governing units including the procedures used to enable the general public to participate in and assess the performance of the agencies.

PROBLEM IDENTIFICATION

While the requirements of §208(c)(2) provide a specific list of criteria by which the legal capacity of areawide wastewater management agencies can be evaluated, the problems identified from an analysis of the experience of operating agencies based on the assessment criteria above tend to be less explicit and often overlapping. Among the general problems which have been identified are: (1) a metropolitan or areawide agency or group of separate agencies ability to be created by the local, metropolitan, or state legislature with sufficient authority to implement and coordinate the areawide plan for the metropolitan, or regional area. The experience of the Twin Cities Sewer Board is particularly instructive in this instance; (2) the capability of an areawide water quality management agency for constructing an operating facility, or providing interim facilities until a full plan may be implemented; (3) the eligibility to receive planning grants; (4) the capability for initiating additional legislation when required; (5) the capability to perform, either directly or by contract research, feasibility studies for the entire service area and the capability to formulate corresponding alternative approaches to wastewater management; (6) the initiative and ability to conduct public information and education programs; and (7) the legal and administrative capacity to acquire and consolidate facilities to conform with an areawide plan.

SUMMARY OF FINDINGS

In general each of the agencies studied has the legal, institutional and financial capability to ensure construction, operation, and maintenance of present and forecasted areawide wastewater treatment facilities. The Metropolitan Sewer Board of the Twin Cities (MSB) represents a situation typical of that found in the other agencies in that it has authority to implement a much broader array of management policies as well as alternative approaches to wastewater treatment. While there are obvious limitations imposed by the availability of resources, there appears to be a capability to carry out the activities required by §208(c)(2). Lesser problems do exist at present, such as limited authority to develop a charge to individual dischargers based on factors other than volume or BOD. However, legislation adopted in 1973 coupled with certain revisions in administrative rules and regulations provides authority to assess a surcharge to individual dischargers beginning January 1975. Further, there is a political problem in meeting the requirement for a policy board to include a majority of its members elected from the general population in the areas served by the sewer service board. Proposed legislation will provide for an elected Metro Council with an appointed Metropolitan Sewer Board. A corresponding problem of areal and functional harmony is caused by the boundaries of the MSB service area which are not presently coinciding with the larger political boundaries of the Standard Metropolitan Statistical Area (SMSA). Although recent legislation has given additional jurisdiction to the MSB and to the Metro Council, the SMSA was also expanded on the basis of the 1970 census to twelve counties resulting in an even larger gap in jurisdiction between these two entities.

A different type of political problem has been identified in the review of the administrative activities of Metro-Seattle.

Present policy with respect to user rate schedules appears to be based on an early agreement among those individuals and organizations, including the local governments affected, that each participating community in the Metro wastewater treatment system would pay a uniform charge based on volume. This program was initiated on the concept of a common benefit to all participants which would be paid for equally. The requirements for proportionate share or differential rates, §208(c)(2)(G), raises a question about Metro Seattle's capacity to meet the requirements of the Act for future construction grants. Further, while Metro-Seattle has the authority to determine its user charges on factors other than volume alone, it has argued that this basis is presently justified since 94 percent of the total systems costs are determined by the volume of wastewater treated. However, the assumption that a charge based on strength of effluent will have no effect on the volume discharged is questionable and indeed there is strong evidence to the contrary[14][15].

In reviewing the experience and policies of the Metropolitan Sanitary District of Greater Chicago (MSDGC), several similar types of problems have been identified. Among these are the question of whether the MSDGC can refuse service to any municipality or residential subdivision which did not comply with an areawide wastewater management plan as required by §208(c)(2)(H). Under existing municipal and state statutes, the MSDGC must provide service to those communities within its boundaries as long as the technical specifications for connecting sewers into interceptors are met. In a situation similar to that found in the problem of requiring a proportional share of treatment costs in the case of Metro Seattle, the MSDGC presently contends that participating communities currently meet this requirement of §208(c)(2)(G) through the ad valorem tax structure. While the federal guidelines concerning the adequacy of the ad valorem tax structure have not yet been issued, it is possible that an industrial surcharge, when coupled with the ad valorem tax, may provide the mechanism which will meet the requirements of the Act.

In examining the basin-wide agencies, both the Delaware River Basin Commission (DRBC) and the Miami (Ohio) Conservancy District (MCD), no major problems or limitations were identified. However, in each case the question arose as to whether the organization could require pretreatment of industrial wastes by refusing to receive wastewater from any municipality or subdivision. In the opinion of the MCD the question is not one of legal authority but one of administrative policy. Thus, while the authority may exist in each case, it has not been exercised over the period of time the agencies have been in existence.

In examining the experience of a state-wide wastewater management agency, the brief history of activities of the Maryland Environmental Service (MES) has indicated that many problems resulting from sub-state or local wastewater management can be alleviated and solved effectively through an agency which, in effect, serves as a wholesaler of services and specialized skills. The Maryland Environment Service has legal authority to conduct the activities required in §208(c)(2) of the Act. Currently it is involved in consolidating wastewater treatment planning and management activities at both state and local levels. At this point in time it should be noted that the most effective legal sanction which MES has at its disposal is the authority to obtain defaulted payments from local governments by diversion of state revenues which are normally returned to the local governments. Thus, the bonding and financial management role of the MES is greatly strengthened in both the planning as well as the implementation of existing and future wastewater treatment facilities.

Special Problems: Financing Treatment Facilities

In general, the most complex set of problems which this study has identified are those which deal with the financing of wastewater treatment facilities. While there are no clear theories or solutions for dealing with these problems, the identification of such problems and tentative approaches to their resolution are offered as a guide to effective management for those agencies which seek to comply with the requirements of the Act. The first of these problems identified in the category of financing is that of the responsibility for assuming existing debts when a local treatment facility is closed to comply with a new or revised areawide plan. The best evidence available indicates that in situations like this, the new agency acquires the debt responsibility since the debt must be seen as part of the capital cost of implementing the new or revised areawide plan. Two options are possible: pay off the debt immediately or assume the debt on the same terms in order to avoid incurring a large amount of capital costs in the early stages of carrying out the new or revised plan.

Another problem is the question of whether a community or the management agency should be reimbursed for an existing wastewater treatment plant taken over by the areawide agency. It is the opinion of the various administrators and specialists consulted that the group that initially obtained the construction capital funds should be reimbursed at the time of the take-over or transfer of management responsibility. The experience of the Twin Cities Metropolitan Sewer Board offers a valuable guide to situations of this type. In that case, the enabling state legislation gave full ownership of all local municipalities and special districts' plants to the MSB on the first day of the agency's operation. Each governmental unit still was responsible for payments on its debt obligations but full credit was given to these obligations (on a pro-rata basis) on the annual statement of charges issued by the MSB. Thus, the revenues earned in each local jurisdiction were available to be applied directly to the long term debt as well as the increment of service fees due each year to the regional agency (MSB).

Another thorny question raised by several administrators regarding the first lien on the revenues generated by a wastewater management agency goes to the bondholders or the federal treasury. In this regard, recent federal regulations[16] require that 50 percent of the amounts recovered must be returned to the U.S. Treasury at least annually. Of the remaining 50 percent, 80 percent must be applied to future reconstruction and expansion. However, the remaining 20 percent may be added to the revenue obtained from user charges to be applied to the bonded indebtedness.

A related problem is that of delays or serious differences in federal grant appropriations on local agency financing arrangements. The experience of financing consultants and management agencies indicates that this can result in (1) delays in construction in order to get a full formula grant, e.g., 75 percent; (2) the need to acquire short-term loans; and (3) a phased project approach may be required as an incremental solution to delayed federal funding. However, the provisions for incremental grants for each stage of a project may enable the operating agency to maintain a viable payment balance.

Another question raised in conducting this study was: what criteria will be used to determine eligibility of "alternative approaches" to wastewater treatment and their acceptance in the review of grant applications? An examination of the 1972 Act indicates that a broad definition of "treatment works" allows for a much broader range of eligible projects which might qualify if the technical feasibility can be demonstrated[17]. This definition was already incorporated in the plans developed by both Maryland and Metro Seattle over the past three years. However, several problems arise in the consideration of adequate revenue mechanisms to assure that the proportionate share of wastewater management costs is required of each user. As §204(b)(2) of the Act requires that charges should reflect all factors which affect the cost of treatment, e.g., strength, volume, and delivery flow rates, it is apparent that a rate structure based on volume alone will not qualify for grants. Therefore, all applicant agencies must review their existing rate schedules in view of this requirement While specific regulations prohibiting it have not been issued, it is the opinion of the authors that the traditional ad valorem tax is probably not an acceptable mechanism to insure proportionate sharing of wastewater treatment costs. Further, it is questionable whether regulations developed by the EPA will permit variations such as the combined use of ad valorem taxes and rate structures based on volume and strength characteristics.

There has been concern over the basis by which small communities and municipalities using a regional or areawide wastewater system might determine their proportionate share of treatment costs; in particular, whether the requirement for proportionate sharing of costs dictates differential rates among all participating communities in all cases. The evidence obtained from the agencies studied, administrators of operating agencies, and specialists in the field of financing, suggests that "any reasonable and equitable plan" for recovering operation and maintenance costs from user communities should be favorably considered by the EPA. The criteria to be considered here include the total annual revenues needed for operation and maintenance, debt service, the number of persons and industries served, the number of incorporated communities, and related developments in the agency service district. On this basis, each community would pay an amount equal to the actual cost of treating the residential waste and the industrial waste arising from that community. The use of a "volume-strength-time flow characteristic" formula will clearly lead to differential rates among each community discharging wastewater to an areawide facility; consequently, this provides the rationale for "proportional share allocation of costs." A second factor to be considered in the the charge and/or rate structure is the distance between the entry point of a regional wastewater facility and the exit point of a user community or industry. Here, the operation and maintenance costs, as well as the initial construction of interceptors, may require differential rates. In summary, there is evidence to support differential rates, yet precedent and political expediencies may result in a compromise in order to more rapidly achieve a viable regional or areawide wastewater management system and organization. It is our recommendation that every effort be made from the earliest point in drafting an areawide plan to implement a differentiated rate structure. Recent Federal Regulations published pursuant to §204(b) of the Act indicate that communities will not be permitted not to share costs proportionately[18].

What methods are available for wastewater management agencies to recover the industrial portion of costs in order to meet the requirements of §208(c)(2)? In discussing this question, several arrangements were mentioned, the more feasible of which are examined here. From the data supplied by several administrators and consultants, the following approaches emerged:

1) A general (flat-rate) assessment combined with a surcharge, which is determined on a volume-strength-time flow basis; or a general assessment with a separate hook-on fee which may be structured so that it spreads the recovery of capital costs over the lifetime of the treatment facility. This combination or a variation of it is useful in maintaining a control over the inflow of wastewater plants as well as providing for an adequate recovery of costs.

2) A full cost recovery user charge in place of the usual user charge. The charge based on the type of effluent discharge reflects the "price" of handling specific effluents and can be seen as part of the cost of doing business for the industrial discharger. If it is set higher than the average cost of waste treatment, it may also serve to stimulate changes in the manufacturing process or in the choice of materials used. This follows the concept that industries should be encouraged, by incentives, to prefer goods or services, including the process utilized, which pollute less by use of a production cost mechanism. However, determining the basis of such effluent charges will result in a significant information cost which must be taken into account.

3) A user charge alone may offer an administrative mechanism since the effluent charge can be combined with a pro-rated cost derived from a volume-strength-time characteristic formula; and

4) The sale of a "discharge certificate" may also offer a more acceptable device, since this would provide control over the amount of the public good (the assimilative capacity) which a private firm could be permitted. Economists argue that polluters (industrial or residential) would have a strong incentive to decrease their costs by reducing the number of "right to discharge" certificates required[19].

A problem mentioned by many administrators is the question of how a grant applicant might demonstrate financial capabilities for undertaking wastewater treatment facilities and, in addition, show evidence of the agreement to pay the non-federal cost of waste treatment facilities. The most obvious approach to satisfy this requirement is to provide legal documentation of all authority permitted by state and local legislation for raising revenues by either borrowing, assessing user charges, and/or accepting grants.

Finally, the "non-permanent" nature of industrial wastewater dischargers has also been identified as a problem which faces the financial management of the areawide wastewater agency. The question arises as to whether the long-term contractual agreement for treatment of a pre-determined level of effluent can be transferred or must it become a nontransferrable charge against the assets of a firm. The respondents to our questionnaires and individual administrators have indicated that it is reasonable to negotiate a transferability clause with any industrial user since the record historically is quite clear on the probability of small businesses failing, regional industrial plants relocating, and manufacturing operations centralizing. If a reasonable projection of the wastewater discharge load can be defined, then both the treatment agency and the user benefit of the "long-term discharge rights" are free to be sold to other firms which may replace the original organization. It is clear that from a financing perspective, the willingness of firms to commit themselves to long-term contracts is essential if that firm contributes a substantial amount of the wastes to be handled by the areawide facility. Therefore, when a long-term commitment is justified, the industry should also have the right to dispose of its contractual treatment "rights." Further, the ability to sell or lease these discharge rights should enhance both the firm's decision to make a long-term commitment and the water management agency's financial plan so that it can be reasonably assured of revenues over the lifetime of the facility and the long-term debt commitment.

While this list of problems is far from complete, we feel that it identifies the major concerns and experiences of those organizations included in our survey. The suggestions for resolving the problems are more fully explored in the following section in the discussion of institutional models for areawide water qualtiy management. Specific conclusions and recommendations are found in Sections I and II of this report.

SUMMARY

Proposed guidelines issued by the EPA[20] require firm written commitments from major industrial users. Adequate management ability is also required, which might consist of evidence of personnel presently on the staff, the actual facilities available, accounting procedures and agreements with other governmental units. Experience alone may not be adequate, however, since the management of regional or areawide facilities, integrated water-solid waste treatment plants, or industrial pre-treatment facilities may be beyond the capability of older, smaller, "public works" departments. The primary rationale behind an areawide wastewater management agency is its ability to incorporate both technological skills, financial expertise and credit, economies of scale in physical facilities and responsiveness both to the requirements of basin or state plans and to the values and needs of the general public. Thus, the areawide approach allows incorporation of economies of scale as well as encourages the exploration of the most advanced technology available and/or practicable over time.

SECTION V

NOTES

1. A major source of controversy concerns the question of whose forecasts of such parameters and population and industrial development are to be used in planning and design phases.

2. The authors recognize that the use of assimilative capacity as a means of water quality management is counter to correct EPA policy, however, it remains an option worthy of consideration in our judgment.

3. Allen V. Kneese and Blair T. Bower, Managing Water Quality: Economics, Technology, Institutions, Resources for the Future, 1968, p. 42.

4. "Stop Fragmentation of Planning Efforts - Blatnick," Communicator, Great Lakes Basin Commission, Vol. 3, No. 7, January, 1973, p. 2.

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SECTION VI

INSTITUTIONAL MODELS FOR AREAWIDE WATER QUALITY MANAGEMENT

INTRODUCTION

The purpose of this section of the report is to develop three models for water quality management -- an areawide model, a basinwide model, and a regionalized state model. These models emerge as a synthesis of this study in that they incorporate features gleaned from the literature and from a review and analysis of existing management entities. The models are "ideal" in the sense that they are designed to meet the evaluative criteria used in this report.

Four criteria were used to evaluate institutional arrangements for water quality management. These criteria are (a) information generation, (b) representation, (c) efficiency, and (d) effectiveness.

Information Generation: An organizational arrangement for public management of water quality must have the capability to develop and disseminate broadly data related to a wide range of technical and management alternatives, their costs, and their consequences. Further, public institutions should initiate plans, develop policy alternatives, and carry out analyses for water quality management which reflect the perceptions of water quality problems and value preferences, i.e., the differences in individual perceptions of water quality problems held by those citizens affected by areawide programs. The introduction of new, issue-relevant knowledge as it relates to the range of problems in wastewater management is basic. It can be ecological, economic, legal, administrative or technological, but the generation of such information is crucial for policy content, organizational structure, and administrative performance. The acquisition of the widest range of knowledge is vital and thus is a primary element in the overall effectiveness of a public organization. The most common methods of generating this information include compiling historical experience, census data analysis research and development, planning, developing educational programs, and economic analysis of all costs and benefits in each problem.

For water quality management to be successful, every attempt must be made to augment policy with adequate information for decision-making criteria. Thus, the range of activities which lead to the generation of adequate information include:

- Establishing quality standards, monitoring and control measures;
- Evaluating external (social) as well as internal costs;
- Measuring future human needs as well as present ones;
- Prior evaluation of actions (technological or administrative) in terms of ecological balance and species survival;
- Broad public participation in environmental policy so that decisions represent, as much as possible, a consensus of the subjective trade-off analysis involved.

Representation: A member of a legislative assembly who is assumed to speak for, and safeguard the interests of, the people of a geographic or other constituency who elected him is carrying out a representative role. In practice, members are usually required to reside in the districts they represent; they attempt to secure patronage and administrative favors for their constituents; and their legislative attitude is greatly affected by the temper of electoral and public opinion in their respective districts.

In the models discussed in this section, the criterion of representation reflects this concept and is applied to the notion that areawide management agencies should be guided by policies which are determined either in state legislatures, county boards of commissioners, or metropolitan/city councils, in which each elected member is expected to weigh the entire range of public values -- both social costs and benefits -- in his policy decisions and program choices related to water quality management.

Our use of representation in this section is intended to emphasize the need for citizen participation in policy decisions related to areawide waste water management, through elected public officials who participate with full authority in all policy decisions, whether in the Board of Public Works, Board of County Commissioners, town council or Regional Water Resources Boards, to name a few. The degree of representation can be measured by determining whether all citizens in an areawide wastewater problem jurisdiction have equal representation on the policy board, i.e., whether they are represented by elected officials who represent equally apportioned districts within the problem area.

Efficiency: Institutional arrangements should be capable of weighing external cost/benefit effects of decisions. The arrangement should foster the accomplishment of water quality goals in the light of physical, chemical, and biological characteristics of water quality, available technology and human behavior. This means that the institution must be adaptable to both the specific physical situation and available technology. In the more narrow but common useage, efficiency means achieving the maximum results with the minimum use of resources.

Effectiveness: Implementation of wastewater management plans through institutional arrangements must offer promise of achieving the results sought (goals), within the period of time specified for each project, whether the task is construction of facilities or a management study. Effectiveness can be assessed by both objective and subjective indicators of output such as: realization, complete or to a substantial degree, of program goals; high output; ability to absorb changes and remaining up-to-date in technology and managerial skills; and preservation of agency resources, both human and material.

WATER QUALITY MANAGEMENT MODELS

The Act calls for the development and implementation of "areawide waste treatment management plans" [§208(a)] and the Governor of each State shall designate "one or more waste treatment management agencies. . .for each area designated under Subsection (a) of this section. . . ." [§208(c)(1)].

The purpose of this section is to develop three models for areawide waste treatment management agencies, based on the specific criteria of §208(c)(2). These models are derived from several general models of metropolitan water management agencies which have been developed in past studies dealing with the technical, legal, administrative and economic aspects of water quality management[1].

Each of the three "idealized" models have been developed in terms of: (1) the technical functions essential to effective water quality management; (2) the formal organizational arrangements, both internal and external; (3) the administrative processes: authority, legislative mission, goals, and decision-making procedures of a management agency; and (4) the political responsiveness of the institution, e.g., representation of, participation by, and accountability to those who may be affected by areawide wastewater policies.

More recent studies have brought together several current technological, economic, and political considerations that are relevant to the problems of water quality management. A generalized model of this recent approach is shown in Figure VI-1[2].

> Defining the level of water quality to be achieved and the optimal combination of measures to achieve it, within the context of overall water resources management will be of no avail if there is no adequate organization or institution or agency to implement the system and carry on the bundle of activities involved in water quality management[3]. (Emphasis added.)

The key word here is "adequate," and it is this requirement which is at the heart of the three areawide models examined below. Thus, agencies with the authority to plan and implement management programs on an areawide or basinwide basis would be responsible for utilizing previously developed plans, the design and construction of facilities, day-to-day operation of facilities, monitoring water quality and discharge sources, and conducting research. Given these functions and the relevant problemshed as its jurisdiction, the optimal management agency should be able to satisfy the six principles suggested for evaluating regional water quality management agencies[4]:

1. The regional agency should internalize the major externalities associated with waste discharges to the watercourses of a region.

2. The regional agency should be able to implement all relevant measures to improve water quality.

3. The regional agency should be able to take adequate account of the interrelationship between water quality and other aspects of water resource development and use.

4. The regional agency should be able to take adequate account of the interrelationship between water quality management and land use management.

5. The regional agency should be able to take adequate account of the interrelationship between water quality management and impacts on other aspects of environmental quality.

6. The regional agency should provide an opportunity for affected parties to have a voice in decisions.

WATER QUALITY MANAGEMENT

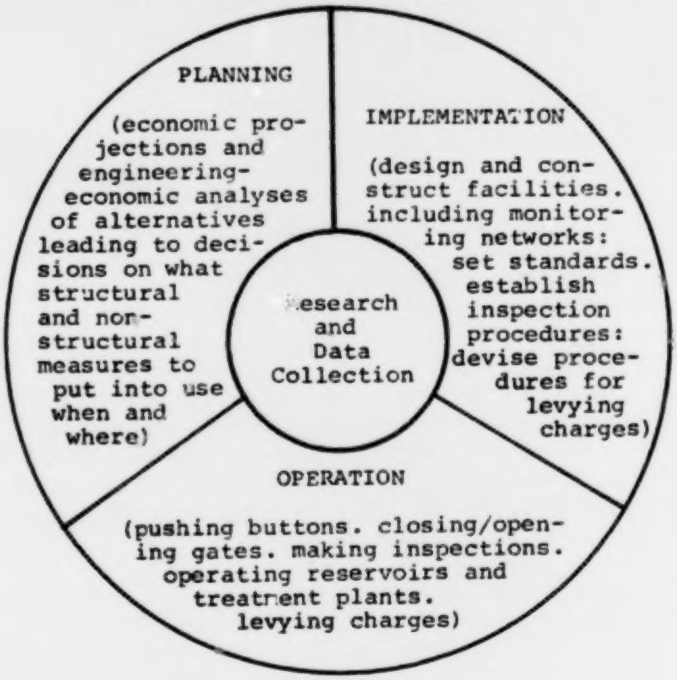

PLANNING
(economic projections and engineering-economic analyses of alternatives leading to decisions on what structural and non-structural measures to put into use when and where)
IMPLEMENTATION
(design and construct facilities. including monitoring networks: set standards. establish inspection procedures: devise procedures for levying charges)
Research and Data Collection
OPERATION
(pushing buttons. closing/opening gates. making inspections. operating reservoirs and treatment plants. levying charges)

FIGURE VI-1

Three models for managing water quality that appear capable of satisfying the evaluative criteria delineated in this report as well as meeting the requirements of the Act are the areawide model, the basinwide model, and the regionalized state model. The evidence obtained through this study has suggested that while the majority of functions, structural arrangements, administrative processes and political responsiveness in each of these distinct types of organizations are very similar, there are distinct differences in each case. This section will discuss each of the three models within the context of these four major characteristics in order to highlight these similarities and differences.

Areawide Model

The first model -- an areawide water quality management entity -- is drawn from the definition of "areawide" used in this report. Therefore, as used in the Act, this refers to the areas in and around metropolitan urban-industrial concentrations. The principal activities or functions of a management agency would be areawide planning, financing, design and construction, and operation and maintenance[5].

Functions

Planning for the areawide jurisdiction is most often carried on by a centralized planning office in the metropolitan government. For example, the Metropolitan Council of the Twin Cities (Minnesota) provides areawide development planning as well as resources management planning. In this case, the Metropolitan Council was created by the state legislature and is responsible to it through the 15 part-time citizen members appointed to make up the actual policy-making Council. The Council has jurisdiction over an entire seven county area, within the 10 counties which comprise the actual SMSA. The planning department reports through the executive director to the Metropolitan Council and interacts actively with the operating departments such as the Metropolitan Sewer Board (MSB)[6]. Specific policies for wastewater management are developed by the MSB Advisory Committee.

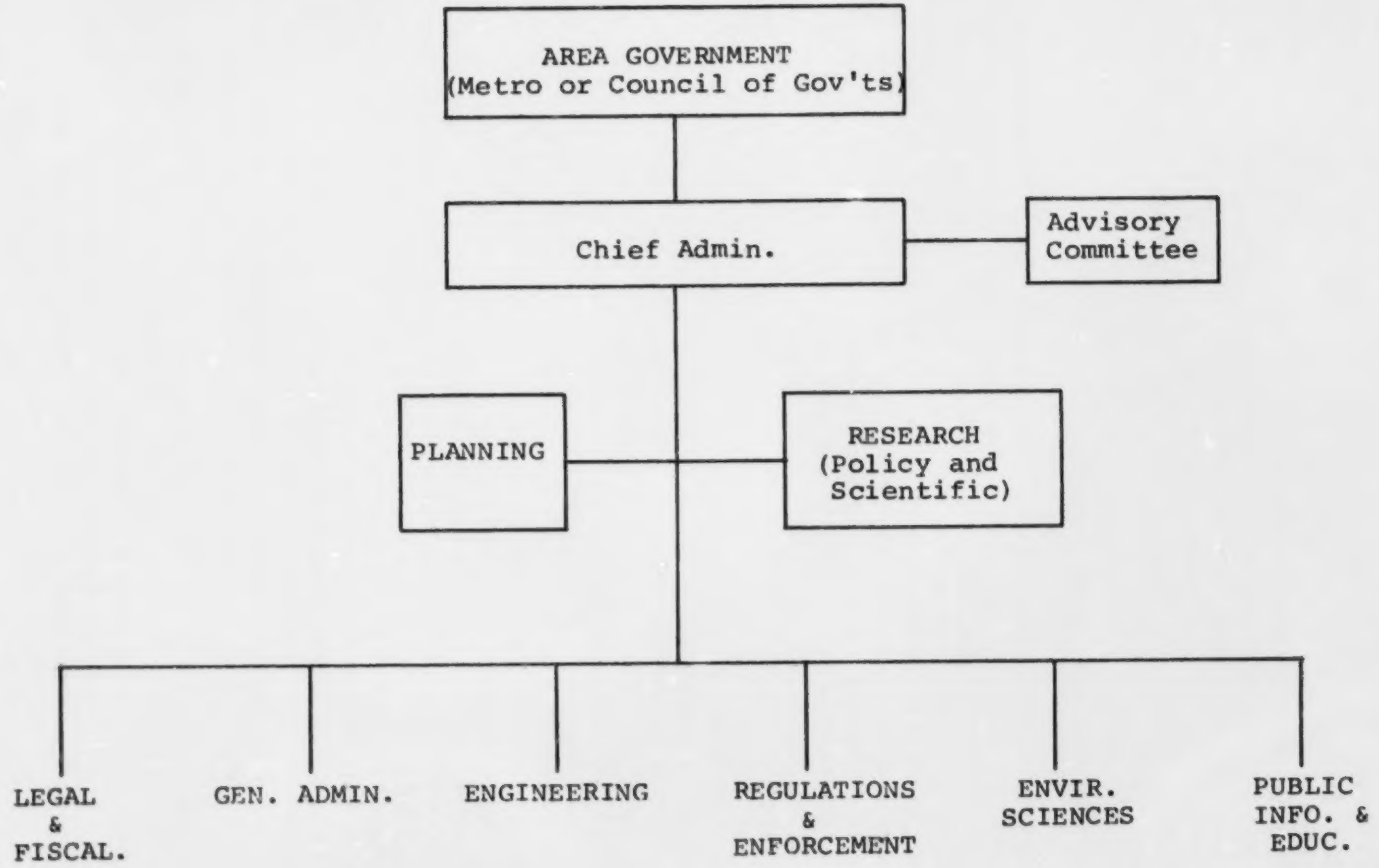
In addition to short and long range planning, an Areawide Water Quality Management agency will be responsible for: 1) the operation and maintenance of all physical plants including the determination of personnel qualifications, training, and maintenance; 2) management of the laboratory facilities required for monitoring and testing of water quality, including fixed and portable monitoring stations used to obtain ambient water quality measurements; 3) the data collection and biological-chemical analyses; 4) research, system model development and identification and control of non-point sources; and 5) the regulatory activities, such as permit issuance, continuous monitoring of industrial and other major discharges, and initiation of enforcement proceedings when violations have been determined.

Formal Organization

The formal structure developed by an areawide agency would normally include functional departments and divisions such as administration, business services, financial management or comptroller's office, construction, engineering, quality control, and operations. In addition, there should be a laboratory division which may report through the quality control department and may include one or more physical buildings and facilities. This organizational arrangement is designed primarily to implement policy decisions and areawide waste treatment plans. One specific authority which should be included in any proposed legislation for regional agencies is the mechanism for acquiring ownership of existing facilities; in this regard, the Act establishing the Metropolitan Sewer Board of the Twin Cities offers an instructive example[7]. A typical areawide organizational arrangement is shown in Figure VI-2.

Administrative Processes

In addition to the internal management procedures, the relationship between an areawide water quality management agency and other organizations at the state, regional, and metropolitan or local government levels are also major considerations in the institutional model. Typical relationships or linkages will include a) planning and operating activities on a day-to-day basis with those community or county governments which participate in the areawide wastewater system; b) the relationship with the parent metropolitan council or area government, including both the cooperative planning activities and the budgeting process; c) the relationship with the State pollution control or water quality agency with which the areawide organization must continually maintain a close communication in order that all program plans, design of facilities, and regulatory activities comply with the state regulations and statewide or basinwide plans; d) the relationship with the Federal Government, especially with the Environmental Protection Agency, and to a lesser extent, the Department of Housing and Urban Development; e) the on-going contacts with major industrial dischargers regarding industrial waste treatment as well as local governments to keep abreast of community or residential developments which require continual assessment of the wastewater loads imposed upon the system; f) the external relationship with the metropolitan council and/or the state government department in which the overall performance of the areawide wastewater management agency is assessed. What is important in all of these relationships is a continuous interchange of goal statements, plans, and water quality reporting, as well as the more obvious budgetary audits and program schedules. Thus, a combination of 1) internal evaluations by the operating agency, to determine if they are in fact achieving the objectives for which they were created, and 2) external evaluations, to determine if the state water quality standards are being achieved as specified in federally-approved statewide plans, are necessary. Further, it is most important that a continuous program review be provided to determine whether these objectives are being achieved in an efficient and equitable way. For areawide


AREA GOVERNMENT
(Metro or Council of Gov'ts)
Chief Admin.
Advisory Committee
PLANNING
RESEARCH (Policy and Scientific)
LEGAL & FISCAL.
GEN. ADMIN.
ENGINEERING
REGULATIONS & ENFORCEMENT
ENVIR. SCIENCES
PUBLIC INFO. & EDUC.

AREAWIDE MODEL

FIGURE VI-2

organizations, performance assessment should be primarily a responsibility of the state government. Although the "watchdog role" is clearly recognized as a necessary function of government, if effective water quality management is to be achieved, performance assessment does not yet appear to have been given the priority it deserves, except at the federal level. Two notable exceptions are those in Illinois and Minnesota. Illinois has statutory provision for citizen's actions before the Pollution Control Board, in which legal and technical assistance is provided by the Illinois Environmental Protection Agency, while Minnesota recently passed legislation permitting citizens' lawsuits for injunctions against alleged pollutors and the right to sue to enforce regulations or standards of the Pollution Control Agency.

Political Responsiveness

Effective water quality management involves the dynamics of policy-making, implementation, and assessment. The two crucial elements which our survey indicated are: 1) that adequate institutional mechanisms be provided whereby problems may be identified, citizen demands may receive an adequate response, and questions of equity and efficienty may be raised by all classes of waste dischargers; and 2) that clearly understood channels of informal communications be established for those local governments for whom the cost of disposing of wastewater is a significant part of their operating budgets. Major policy choices or program decisions are a critical step in the effective management of water quality organizations. While in the past typical areawide water quality organizations have been governed by a board, council, or commission normally comprised of appointed members from the area served, there is increasing evidence of interest in a policy board comprised partly or wholly of elected representatives of the different jurisdictions affected by the activities of the water management agency. Thus the decisions which determine both objectives and implementation strategies will emanate from a broadly representative legislative council or policy board in such a manner that policies dealing with water quality as a management service will more accurately reflect the changing circumstances and values of the general public served. Further, it will assure consideration of the trade offs between other sectors (education, transportation, for example) as well as within the environmental management sector (air, water, for example). With regard to the Act, all areawide wastewater management agencies should review the makeup of their policy board since it is clear that the Act strongly suggests that these boards include elected officials from general purpose governments in the jurisdiction of the areawide wastewater management agency. However, the final decision in this structuring may be left to Governors of the states.

In addition to the formal aspects of representation as one measure of responsiveness, the needs of the organization and the wishes of the general public will also be better met if the decision-making processes at all levels in the areawide water quality management organization are readily accessible to public participation. This refers to open hearings for rules and regulations, enforcement proceedings against violators, and citizen's complaints. Further, other governmental agencies, both local and metropolitan, should be included either through membership on advisory panels or commissions, or by representation on the governing council of the metropolitan area. The case of the Metropolitan Council of the Twin Cities is significant in this regard in that a council of 15 members having responsibility for broad policy decisions draws on a large number of advisory and statutory boards or committees in order that a wide range of issue-relevant information may be continuously brought to its attention and to allow trade-offs among various sectors to be considered by all departments and interested parties.

In another instance, the Seattle Metro government suggests a variation of this arrangement. It is governed by a Metropolitan Council representative of the areas in its jurisdiction, made up of 36 members -- mayors, city councilmen, county commissioners and independent representatives. The Metro government serves areas outside of its political boundaries -- King County -- and seeks to provide for unofficial representation from these areas as well as from within King County. In brief, through the inclusion of elected representatives on the Metro Council and the requirements that any new service areas, additional functions or approval of bond issues, and/or tax levies be placed before the voters, the general public has a wide range of access to policy planning and management.

In summary, the nature of an organization designed to provide wastewater management for an area of industrial and urban density which meets the requirements of §208(c)(2) for "areawide water quality management" requires the ability to manage effectively all facilities required to maintain water quality, the functional divisions and skills to develop policies which incorporate the full range of individuals, governmental, and industrial interests in its jurisdiction, and the capacity to develop long-range plans for the area within its boundaries. In particular, this should include a formal participation in the planning process at state and regional levels by the areawide planning organization. The unique features of an areawide agency are primarily those brought about by the fact that its jurisdiction may cut across hydrologic boundaries on one hand and yet includes the total problemshed in which large numbers of water users and waste dischargers are located. Thus the management institution should provide for the broadest range of public and private inputs to achieve a level of responsiveness which reflects the needs of the public within the area it serves.

Basinwide Model

A second type of institutional design for water quality management is the basinwide agency. Examples are the Miami (Ohio) Conservancy District, an intrastate basin arrangement and the Delaware River Basin Commission, an interstate basin arrangement. The intrastate basinwide water quality management agency is characterized primarily by the fact that its activities are provided within and across several political jurisdictional boundaries in one state. Thus its service area extends beyond any single county or city and includes both commercial and industrial dischargers as well as municipal dischargers, non-point sources, and generally, all wastewater producers using a specified river basin.

Functions

In particular, the functions of a basinwide agency are more numerous than an areawide organization, and yet a larger portion of these may be delegated to areawide agencies, township or county governments along the basin. In the case of the Delaware River Basin Commission, the primary objective up to 1972 has been flood control and low-flow augmentation to insure adequate supplies of irrigation and drinking water along its basin. These activities require almost the same skills and administrative capabilities as an areawide agency -- engineering, financing, operation and maintenance, and legal. However, if such an organization is to be responsible for wastewater management it will also require sanitary engineers, water quality specialists, system analysts and economist-planners.

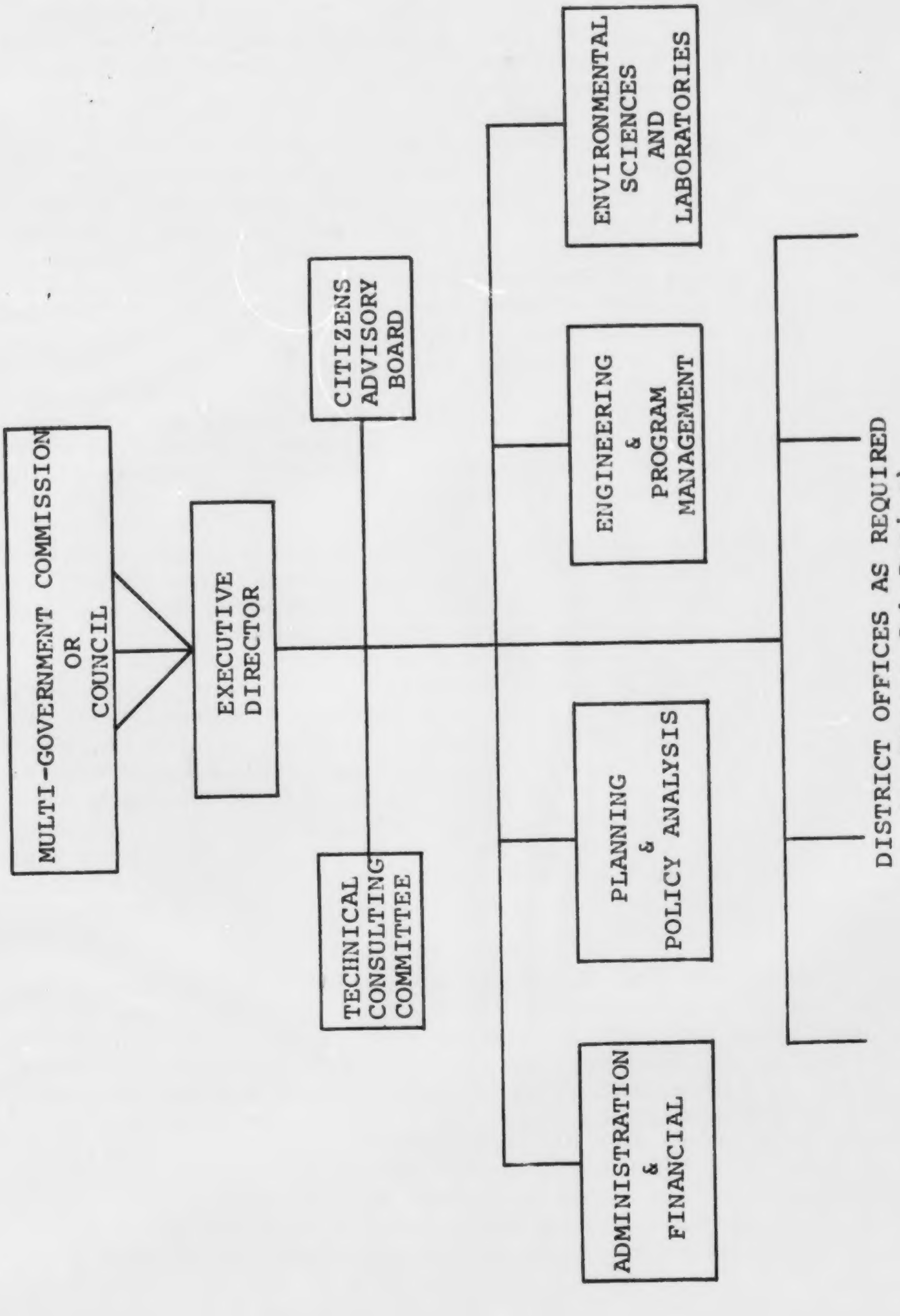
Formal Organization

Since the problems of planning and operating the facilities necessary to achieve water quality in a river basin determine the structure and the administrative procedures of an effective management agency, an institutional model based on a river basin must take into account both the interests and capabilities of county and municipal governments lying in the basin controlled by the agency. Furthermore, authority to set satndards, locate facilities, and oversee planning and construction schedules and discharges must be clearly delegated between local, basinwide, and state level management and regulation. The organizational structure of such an agency should, therefore, include not only the required functional divisions to perform technical and administrative activities but should incorporate a direct linkage with the local communities and also with the state water quality management agency. Thus, while a river basin may include all or part of a SMSA, there must be a mutually agreed upon approach, both in planning and in regulation, to achieve water quality management at the intersection of the SMSA boundaries and the river basin. This poses particular problems of representation which are discussed more fully below.

The basic elements of the institutional design then, should include the following: a) advisory board, of which a majority would be elected from the general public or appointed from elected members of general purpose governments throughout the basin; b) a board of technical consultants or advisors who would not necessarily live in the river basin jurisdiction but would have technical, economic or legal expertise and an understanding of the water management problems of the entire state; c) an executive director or manager with the appropriate staff functions under him including financial, administrative, engineering, and policy planning. As a minimum this organization should have the authority to developing basin plan, design and construction, operation, and maintenance; in particular it should have the authority to assess charges, issue bonds, borrow money, and accept grants from outside sources. A typical basinwide organizational arrangement is shown in Figure VI-3.

Administrative Processes

Although the basic activities required for managing water quality are the same for a basinwide agency as they are for an areawide, statewide or interstate arrangement, there are problems of overlapping jurisdictions that will arise because the basin boundaries are defined by geographic or hydrologic criteria, often resulting in the division of a political entity, such as a county or township. Thus the delineation of service areas, as well as specification of services to be provided, should be included in all basinwide water management planning activites. Further, the design and construction of both water supply or protection facilities, e.g., flood control systems and reservoirs, as well as wastewater treatment facilities must take into account the entire river basin system. In one respect, this simplifies the problems


MULTI-GOVERNMENT COMMISSION OR COUNCIL
EXECUTIVE DIRECTOR
TECHNICAL CONSULTING COMMITTEE
CITIZENS ADVISORY BOARD
ADMINISTRATION & FINANCIAL
PLANNING & POLICY ANALYSIS
ENGINEERING & PROGRAM MANAGEMENT
ENVIRONMENTAL SCIENCES AND LABORATORIES
DISTRICT OFFICES AS REQUIRED
(To Manage Sub-Basins)

BASINWIDE MODEL

FIGURE VI-3

of water quality management since a single agency has jurisdiction over municipal and industrial dischargers throughout the entire length of the river basin. The chief advantage here lies in the fact that once a system model of water quantity and quality requirements of the total river basin can be developed, the acceptable levels of discharge at any point along the length of the river basin can be determined both in terms of the water quality sought and in terms of the seasonal conditions which exist on the river, including allowances for ground water requirements. Since the collection and disposal of wastewater and its by-products are more broadly dispersed geographically than in the metropolitan case (urban-industrial concentration), the basinwide agency would require a larger technical staff to develop and operate the facilities required for water quality management, flood control, streamflow regulation, irrigation, and general water supply, and to administer non-structural measures as well. Further, it must include specialists such as economists, ecologists, lawyers and engineers to implement discharge requirements permits and stream quality standards, and to negotiate regulatory agreements with all governmental units within the basin.

While the example provided by the Miami Conservancy District (MCD) is only one approach to this particular form of organization, it is instructive in that it represents a situation found in many river basins across the United States. Although there appear to be several practices of MCD which may not at present meet the explicit requirements of the Act, particularly its regulatory authority, organizational jurisdiction, and representation in the makeup of the governing board, the MCD has the necessary legal authority to carry out wastewater management activities in the Miami River Basin. With the recent creation of the Ohio Environmental Protection Agency, it is not clear at this time whether the State agency or the MCD will undertake enforcement activities, basinwide planning, or construction and operation of facilities for wastewater treatment.

A basic problem in administering a basinwide organization is the question of jurisdiction. The range of regulatory mechanisms available to such an agency must also be carefully examined while the institutional form is under consideration. It is clear that the enforcement role of the basinwide agency should be broad enough to initiate enforcement proceedings and assess penalties for violations of plans and standards; there is also the need to provide access for individual citizen's complaints from those affected by its decisions. It is probable that in many states additional legislation is required to supplement the enabling legislation of existing basinwide districts or authorities. Further, adequate enforcement authority to ensure compliance with a regional waste treatment plan must also be provided, since the use of regional facilities is the key to controlling water quality within the basin. The control over the discharge of wastewater from all other sources, e.g., non-point, is also necessary in order to achieve the quality desired throughout the entire basin.

Underlying these regulatory activities, there is an obvious need for providing adequate public education and an advisory staff to assist local governments and planning units in developing their particular plans and facilities in order to insure integration with the basin plans and the statewide water quality plans. An innovative approach would include the use of closed-circuit television between offices and central computing facility accessible by all users. While the concept of an areawide or basinwide water quality management organization is relatively new, it is clearly the intent of the Act to create this type of organization and the requirements of §208(c)(2) offer a set of general criteria upon which to base the organizational design.

The primary difference in the organizational and administrative aspects of the basinwide approach and the areawide approach lie in the additional number and complexity of linkages and relationships which the basinwide organization must develop with the different units of governments in the basin jurisdiction. Many smaller towns and municipalities may not accept regional or basinwide planning, much less routine operation of treatment facilities, or legal and economic sanctions against the local industry. Thus, provision for integration of local development plans, environmental plans, and financing must be made in both the basinwide planning organization and the basinwide management agency in order that the provision of managerial resources are seen as desirable rather than "outside meddling" in local affairs. This requires a sensitivity to local problems which is difficult to achieve yet necessary if a basinwide wastewater management agency is to successfully undertake implementation of river basin water quality plans. The primary attitude should therefore be one of "What skills can we offer?" rather than one of, "These are the rules and regulations which must be complied with." This is the challenge facing a management agency shaped according to the basinwide model.

Political Responsiveness

The question of responsibility to the general public and to the communities within the basin is of particular importance in discussing a model for water quality management. While it is desirable that the general public should elect the members of the governing policy board, there should also be provisions in the organizational design where appeals can be made, complaints heard, and proposed standards or rules debated, questioned, or formally appealed. The concept of a "Conservancy Court" as utilized in the Miami Conservancy District organization provides one way of meeting this requirement; the open learning procedures of the Illinois Pollution Control Board are another.

Although the MCD Conservancy Court has been criticized as technically unable to decide on questions of water quality as opposed to quantity and also as unresponsive to citizen's requests for a more aggressive water quality orientation, it does provide "outside" review by elected judges. Therefore, the intergovernmental dynamics between state and local government on the one hand, and between these units and a basinwide water quality management agency on the other must allow for expression of public interest demands, industrial users needs, and for continuous review and updating of the approaches used to achieve water quality. Finally, in any organization designed to achieve water quality in a river basin system, the authority given to regulate the wastewater discharges of both municipal governments, industrial plants, agricultural sources, mining, construction, recreation areas or unincorporated communities is critical. Broad authority to require pretreatment of certain types of wastes, assure compliance with areawide and/or statewide plans, and design, construct, operate and maintain wastewater treatment facilities and other related facilities is necessary if the water quality of the entire river basin is to be maintained by the basinwide management agency. Again this may require in some states, new legislation to supplement existing authority.

In summary, while the majority of functions and organizational structure are not significantly different from the areawide water quality management model, the characteristics of a substate regional management agency do create a special set of problems which must be considered in establishing a management agency of this type. One feature not stressed above but while should be included in the creation of such an agency is the provision for assessment of the agency's performance by both the public in the area which it serves and the state government. Clearly this is necessary in order to insure compliance with regional and statewide plans and also provide equitable and efficient implementation of these plans with regard to the general public.

Thus, in an assessment of the basinwide approach, there are several advantages: control of an entire basin, cost-effective location of facilities, advisory services to local governments, and provision of a broader base for financing not available to small units of government. These are confronted by the difficulties of administration of a large geographic-hydrologic problemshed: communication, local autonomy, economic development and public participation. On the basis of this analysis of approaches taken for the major river basins, this model offers significant advantages over existing local wastewater management agencies, assuming it is a clearly stated goal to achieve water quality in the river.

Regionalized State Model

A third model of a water quality management organization is that in which the authority of the state agency extends to regionalized and local management operations. This statewide form of a management agency appears to offer several advantages over the traditional local government single purpose approach to waste management and water quality management. The Maryland Environmental Service (MES) offers an example of a statewide waste management agency. It was established by the state legislature in 1970 as a public corporation with authority to plan and implement programs in the traditionally local sectors of water supply, solid waste, and wastewater management. The State, through the Environmental Service, goes beyond the traditional roles of water pollution regulation and as a source of financial or technical assistance. Through its statutory authority, the MES may enter into partnership with local governments and private industry to provide a wide range of services including planning, design, financing, construction, operation, and maintenance of treatment, reclamation, and disposal facilities.

Functions

The principal activities of a regionalized state wastewater management agency should include planning, research, design and construction, operation, regulation and performance assessment. A regional water quality management agency requires authority to provide all liquid waste management services to counties, municipalities, and industrial plants. This enables the state, through the management agency, to expand the role of state government from simply performing regulatory duties and providing financial assistance to one of full partnership with political subdivisions such as municipalities and counties as well as with industry. Further, such a role allows a wide range of services to be provided, such as a) the development of fully integrated plans for regions and problem areas, including the designation of service regions for wastewater (and as needed for solid waste disposal); b) research and development to improve methods and techniques for waste collection (municipal and industrial), transportation, processing, and disposal; c) acquiring, designing, constructing, improving, operating and maintaining, wastewater treatment facilities; and d) technical assistance to local government for planning, financing, design and construction, and operation of wastewater management systems. With adequate legislative authority, a regionalized state management organization may serve as a "statewide sanitary district" and would have the mandate and resources to draft and implement comprehensive waste management plans as the means of implementing a regional approach to waste management.

Formal Organization

The structure of such a management agency should include certain basic elements common to all wastewater/water quality management organizations. A typical structural arrangement would include the following: 1) a board of directors; 2) a director of the agency; 3) an administrative services unit; 4) a policy planning and project development section; 5) a design and construction department; 6) an operations and maintenance department; 7) a legal services department; and 8) a financial and grants management unit. The experience to date in Maryland indicates that there are significant administrative advantages to be obtained by contracting with private technical organizations (e.g., engineering consulting firms or testing laboratories) rather than increasing the size of permanent departments in the state agency. However, there are clear drawbacks to this approach which may limit its effectiveness, especially if there is a large concentration of skilled manpower in the parent State agency to which the state-wide water quality organization is attached or others with parallel responsibilities. In many instances, private, nongovernmental organizations would lack historical perspective and an in-depth understanding of the intergovernmental problems involved in implementing regional or statewide wastewater management plans.

Major components in an organizational design are those of planning and program development, in addition to the basic departments responsible for financial management, operations, and regulation. It is also important that adequate resources be provided to implement discharge requirements, stream standards, and health standards for wastewater management (and solid waste disposal as its affects water quality) through cooperative relationships with the departments of health or natural resources. In particular, the planning functions should provide for a continuing exchange of information relating to land use planning, water resources planning, and water quality management plans. Thus, an important structural factor to be considered in any regionalized water quality management agency is provision for inter-agency coordination among all levels of governments, of the planning, design and construction activities for water quality management.

Administrative Processes

Various relationships must be provided between other state units, local government and the private sector, in order to develop the necessary communications and integration of management activities listed above. The nature of such an agency is that it is both a regional service institution as well as a management tool through which state government may achieve a more comprehensive approach to effective residuals management. Therefore, it provides a management as well as a regulatory approach to environmental quality. The primary rationale here is that a "comprehensive management approach" can work more effectively to achieve both pollution control and resource protection goals. This is in contrast to a "limited regulatory approach" which often seeks (and accepts) compliance with minimum water quality standards by municipal governments or industrial waste dischargers. The range of benefits to be expected from a regionalized state management approach includes: 1) the capability to institutionalize a regional approach to planning, construction, and management of wastewater and solid waste facilities in order to take advantage of both economies of scale and the regional, "problemshed" characteristics of water and land resources. In so doing, a greater range of administrative fiscal and regulatory options are available to achieve optimal environmental quality than are available to fragmented, special purpose agencies, or utilities organizations; 2) the ability to secure better financing arrangements than is generally possible by local governments; and 3) the ability to ensure compliance with the water quality standards and discharge regulations of the state as specified in statewide, basinwide, and areawide plans.

A serious drawback to this regionalized-state level of water quality management is the distance from people and problems at the local level. Two approaches to minimizing this problem have been suggested in recent studies[7]. The idea of locating regional offices of the state agency at the site of major water quality problem areas would act to decentralize the department in its daily linkages with local governments and still would permit direct administrative coordination with the office of the Director. By providing a staff of specialists close to local and regional problems, all of whom report to the same administrator, problems of distance and communication can be reduced. A second approach, a variation of the first, is that utilized in Vermont. Here the Agency for Environmental Conservation, with responsibility for environmental quality and water resources management, works through the Environmental Board and the District Environmental Commissions to carry out the requirements of the land-use permit system. In this case, the board has a series of regional offices, covering one or more counties, which conduct hearings and issue permits for land use. Appeals are forwarded to the full Board in the state capitol for resolution. Applying this notion of local action and local administration, coupled with the formal organizational structure at the state level, to the Regionalized-State Water Quality Management model, it is possible to overcome the potential problems of distance and communication.

Several basic elements are required to develop management strategies and implementation plans in a state or regionalized water quality management organization. The most important of these are 1) the authority to integrate planning and implementation; 2) the authority to finance projects which are specified in state, basin, and areawide plans; and 3) the authority and resources to enforce standards, permits, and health requirements, as they relate to a larger concept of water quality management. Thus, as the Maryland example indicates, the regionalized organization is authorized to act as an agent and technical advisor on behalf of a number of individual dischargers, in order to bring together two or more jurisdictions and point sources of wastewater to arrive at a more cost-effective solution[8]. These jurisdictions may include either local governments, counties or municipalities industrial firms, or state-owned facilities. One result to be expected is the economies of scale of both engineering and skilled operating manpower resources which are normally not available to small communities or county governments. An important principle to be incorporated in the design of such a model agency is that of regionalized services, that is, the agency serves only as a wholesale outlet in financing, construction, or operation of waste water treatment facilities while its knowledge of the problems of wastewater management often provides useful feedback for local or regional land use planning. The reliance on state, regional, or local land use development plans will enable a regionalized agency to obtain a wider range of inputs on such questions as: what objectives should be sought in these plans and how should areawide or regional planning be carried out?

A key administrative tool in providing adequate financing authority for a regionalized approach is the use of the full-cost recovery user charge based on both volume and strength characteristics. This concept provides the rationale for a differential rate structure for different types of waste water discharges into public waters. The same principal is valid for municipal waste water systems by applying the differential rate schedule to volume-strength-time flow characteristics of the waste waters discharged into state waterways from municipality treatment plants. A combination of discharge permits, effluent charges, and water qualtiy standards should enable the regionalized state agency the maximum degree of flexibility in dealing with a wide range of volume-strength discharges and thus offers a set of alternative strategies to achieve compliance by local governments and industry.

Political Responsiveness

One other necessary aspect in the model of a regionalized water quality organization is the nature of the representation in its policy-making board and the provision for public participation in filing complaints, reviewing proposed regulations, or in requests for variances by polluters. In the case of the Maryland Environmental Service, which is a line agency of the state government, the legislature through its committees serves as the primary focal point for public demands. The agency is headed by a Board of Directors, composed of the Director, Secretary, and Treasurer of the MES. However, one criticism of this approach lies in the fact that the board of directors is twice removed from the electorate since they are appointed by the Secretary of the Department of Natural Resources with the approval of the Governor and there are no provisions for advisory committees either in the Governor's office or to the MES. An alternative model would include an "Environmental Advisory" board whose members are elected from the general public directly or as representatives from general purpose local governments which utilize the services of the regionalized agency.

Further, there is a need to provide a citizen's advisory committee with the freedom to review the program planning decisions, management decisions, and the environmental impact of the policy decisions undertaken by the agency. While the basic nature of legislative control in the case of Maryland does provide one mechanism for citizen input, the number of claims on state legislators' time and energy is great and very often the individuals do not have either the technical or administrative resources to respond to the concerns of citizens. On the other hand, as the Maryland case illustrates, a new agency having state-wide authority can find shelter under the aegis of an existing state agency in its early years of operation which enables the state legislature to maintain a close watch on its operations while it is getting experience. In addition, as the Maryland experience also indicates, the freedom of the agency to retain all financial and manpower resources provided by the legislature each year removes or minimizes the political dependence upon the parent agency.

Alternative schemes which would provide more direct public participation are those used by the Metro-Council of Minneapolis-St. Paul, in which the line agency has its own advisory committee; the New York arrangement in which an Environmental Board has veto authority over the Environmental Conservation Commissioner and is composed of the heads of all State Agencies which have an environmental function plus public members; or the divided arrangement devised in Illinois, where the enforcement and operating agency, the Illinois Environmental Protection Agency, is separate from a policy-making and standard-setting agency, the Illinois Pollution Control Board, whose members are appointed by the Governor for a fixed term. The PCB's hearings on rules and standards, violations and complaints are all open to public participation. One valuable safeguard developed in the Maryland experience, is the idea that local water quality management plans should be developed in conjunction with and thus complement land use plans prepared by local governments. The underlying principle in this case is that water quality management's role in planning should be to assist in obtaining resources, hardware, and facilities to implement land use planning, not control it. Therefore, in any institutional design for a regionalized water quality management organization, provision must be made for the proper degree of autonomy in water quality management decisions by the regionalized state agency but with adequate consideration of land use planning and control expected by local or county governments. Past experience indicates local or county governments will seek a significant degree of autonomy in making decisions which affect their political and fiscal stability.

An important contribution of a regionalized agency is the provision of technical and fiscal management skills coupled with the ability to integrate basinwide, areawide, and statewide water quality management plans. The regionalized state water quality management concept would therefore be very different from the current practice of basinwide planning now underway in several parts of the country. The regionalized state agency would be able to serve as an operating entity also and, in addition to its involvement in planning, it would have the responsibility for operating all facilities in any region in the state after determining the capability and obtaining concurrence of the local governments involved. The primary value in allowing a regional or state-level input to local planning lies in the evidence and data which it could provide to aid in the assessment of the consequences of one particular (local) development plan as compared to another. This would serve as a type of "feedback" to local or regional planners and should enhance the activities carried out at those levels.

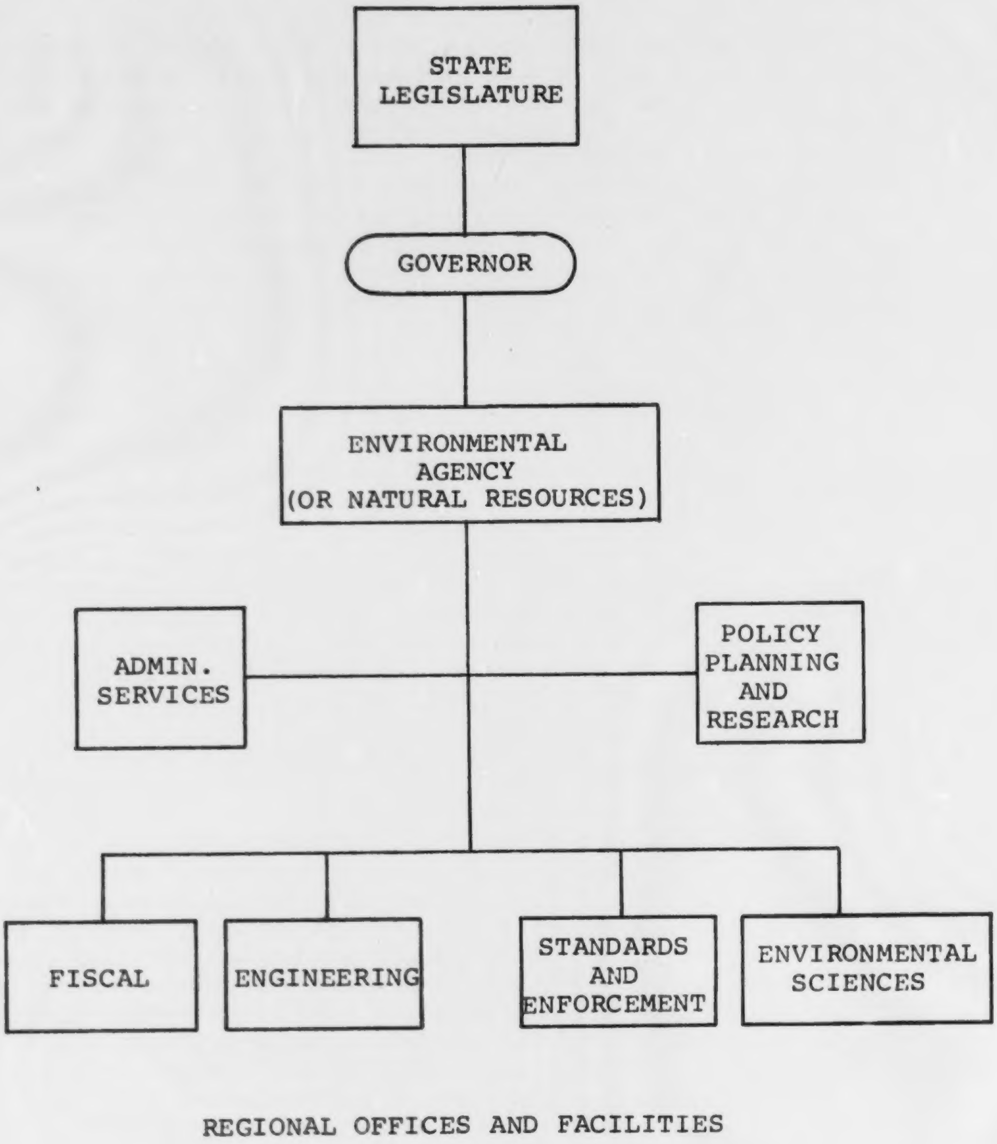
At the same time, experience has shown that planning data and problem forecasting information does not always reach those individuals, governments or industrial organizations which will be most directly affected in time for their reaction and rebuttal. This is made more difficult if planning groups are within the confines of the state capital. Therefore, any institutional design based on a regionalized state model must also provide for rapid dissemination of all technical information and must adhere to a policy of broad public education and participation through hearings and "town meetings" if it is to gain acceptance of its water quality management plans.

In most situations the constraints and regulations established by state and federal agencies determine the type of integrated management services provided. As an operator of waste treatment facilities, a regional or state agency would have the responsibility to protect the environment just as any other individual waste discharger would but it would do so with a broad view of the entire resource system since it would have all planning data at its disposal for either the region or the entire state. Consequently, it will provide a vehicle by which the goals of environmental quality and resources utilization might be more effectively realized and trade-offs among the sectors at the state level could be examined. In a recent paper, the director of the Maryland Environmental Service provides a similar, persuasive argument for the regional approach [9]. In his view, direct provision of waste management services by state agencies is simply an expansion of the direct services now accepted as state responsibility and is not in conflict with the notion that the states' primary responsibility is enforcement of laws (i.e., the police power). The concept of a state agency acting to implement water quality management plans along with solid waste management plans eliminates one of the inherent weaknesses of the enforcement approach, namely, requiring the most desirable rather than settling for the merely acceptable solution. In this light, both environmental quality and cost-effectiveness criteria would be more adequately met when two or more local or regional governmental units participate jointly in managing a waste water treatment facility based on areawide planning by the regional or state organization rather than each attempting its own inefficient and perhaps inadequate solution. Therefore, it is felt that a regionalized wastewater agency based on this model will provide significantly effective solutions to such problems as: (1) the provision of regional wastewater management in those areas where it is needed and does not presently exist; (2) the provision of improved financing capability through its greater bond issuing authority at the state rather than local level; (3) assurance to local governments that equitable arrangements will be incorporated into the regionalized-state organization in order to reduce the traditional fears that exist among local units of government and their specialized, single-function agencies, and the absence of technical resources in many municipalities. When this model is compared with the two described earlier, several differences start out along with the similarities. Most basic is the difference in jurisdiction and the role of the state legislature serving as the representative governing body. The additional economies of scale in local plans with regional plans should also be noted. Clearly, such an agency cannot be expected to manage, operate and regulate all local or regional facilities and programs and it must rely on local government to the fullest. However, its single greatest advantage is the ready availability of technical skills, fiscal standing, and its use of statewide planning data. Problems which can be expected include state-local management of facilities, acquisition of or closing down small, inadequate treatment plants, and sanctions against small industries which may threaten the economy of small towns or counties. Many of these points are discussed in a recent paper, which develops the concept of a regional utility approach to a comprehensive environmental agency[10]. While a comprehensive, multi-media agency dealing with air, water, and solid waste problems is broader in scope than the subject of this study, the elements described and the advantages suggested serve to clarify this concept as an innovative organizational change which should enhance the ability of state governments to provide a quality environment. The significant idea presented is that a regionalized state organization under the umbrella of a statewide environmental utility or environmental quality agency, would allow regional branches to be established in areas where the distribution, strength and volume of wastewater discharges require an integrated approach to waste management. Thus, following the model discussed above, a regional agency would be established at the state level, provide financial guidance and organizational services to its regional branches, and management advice to municipalities and industries that are located in close proximity to the regional branches. While it would still serve as an operating agency, it would not interact with individual citizens and would deal with individual industries only when their waste water discharge was of such a nature that it could not be treated or handled by a municipal or county wastewater treatment system. Figure VI-4 illustrates the general organizational scheme of a typical regionalized water quality management arrangement. In each case, as the ability to handle a broader range of problems enlarges the scope and jurisdiction of the areawide management organization, the public accountability becomes more diffuse due to the greater distance between the public managers and the people affected by the organization's policies. Thus, the issue of responsiveness and accountability is clearly one which must receive attention in any institutional design choice. This suggests two approaches to the public accountability problem. One approach is the use of Areawide Environmental Advisory Boards, composed of elected representatives from local governments (towns or counties) that would have veto power over the policy and programs of areawide agencies operating in their locale. Another approach is the use of local environment Boards, or county Environmental Commissions, to provide the expertise and representation in all policy planning activities of an areawide wastewater management agency. This use of elected officials, or local representatives appointed by the governing body of towns or counties would serve to bring the areawide organization into closer contact with local values and needs.

SUMMARY

The three models for water quality management -- areawide, basinwide and regionalized state -- outlined above are similar in several important ways. For example: their principal activities -- planning, financing, design and construction, operation and maintenance -- are the same in substantive terms, but each requires certain differences in emphasis; the powers and administrative methods required to implement effective programs are similar; their basic organizational structure need not differ except in detail to accommodate special localized circumstances; and each shares a requirement to represent their "publics," although the particular arrangement that emerges may differ in detail for any given agency, depending upon the number of governments served and the complexity of securing public participation.

When evaluated in terms of the criteria suggested for assessing water quality management agencies, we conclude that each of these models will meet the tests. In practice, successful institutional design will depend largely upon 1) maximum use of existing legislation at each level of government; 2) innovative administrators to implement programs and seek appropriate additions to existing law;


STATE LEGISLATURE
GOVERNOR
ENVIRONMENTAL AGENCY (OR NATURAL RESOURCES)
ADMIN. SERVICES
POLICY PLANNING AND RESEARCH
FISCAL
ENGINEERING
STANDARDS AND ENFORCEMENT
ENVIRONMENTAL SCIENCES
REGIONAL OFFICES AND FACILITIES

REGIONALIZED STATE MODEL

FIGURE VI-4

3) responsive representatives on policy-making bodies; 4) sustained public participation in decision-making processes; and 5) adequate resources to achieve agreed upon objectives determined by federal and state legislation, local and regional plans, and court decisions. These five needs are obviously interdependent and may be summarized as management skills, resources, and political linkages, all dependent upon an attentive public which can express its demands forcefully.

No model outlined here is inherently superior to the others in its ability to meet the tests of representation, information generation, efficiency, and effectiveness, due simply to the differences that exist between areas, basins and states in terms of the problems to be solved, the resources available, and the institutions that are acceptable in a given location at a given time. Within this setting, it is our belief that each of these management models, with appropriate local modifications and if compatible with existing enabling legislation, are feasible and should be tested. Performance assessment of these efforts on a continuing basis should extend current understanding of the institutional alternatives for water quality management so that each section of the nation may utilize the optimal organizational form to achieve its goal of restoring and maintaining the chemical, physical, and biological integrity of its waters.

SECTION VI

NOTES

1. M. B. MacPherson, *Prospects for Metropolitan Water Management*, A Study of American Society of Civil Engineers Urban Water Resources Council, December 1970; Orlando E. Delogu, *Legal and Governmental Structures for Water Management in Metropolitan Areas. National Water Commission, Legal Study No. 16, July, 1971*. N. William Hines, *Public Regulation of Water Quality in the United States*. National Water Commission, December, 1971. (Report No. NWC-L-72-036). Allen V. Kneese and Blair T. Bower. *Managing Water Quality*: *Economics, Technology, Institutions*, Johns Hopkins Press, 1968; pp. 6-8 and Chapter 14.

   In addition, the following studies are suggested:

   Clifford S. Russell, Walter O. Spoffard, Jr., and Edwin T. Haefele, "Environmental Quality Management in Metropolitan Areas," Resources for the Future, 1972.

   Blair T. Bower, George O.G. Lof, William Heron, "Residuals in the Manufacture of Paper," *Journal of the Environmental Engineering Division*, ASCE, Vol. 99, No. EE1, Process Paper 9543, February, 1973, pp. 1-16.

   Allen V. Kneese, Robert Ayres, and Ralph D'Arge, *Economics and the Environment: A Materials Balance Approach*, Johns Hopkins Press, 197 .

   Allen V. Kneese, and Blair T. Bower, *Environmental Quality Analysis: Theory and Method in the Social Sciences*, Johns Hopkins Press, 1972.

2. *Op. cit.*, *Managing Water Quality: Economics, Technology, Institutions* , p. 7.

3. *Ibid*, pp. 6-7.

4. *Ibid*, 303-308.

5. It is evident that any management agency -- areawide, basinwide, or regionalized state -- will require the basic legislative authority and the technical capability to carry out these activities. Further, it should be understood that this framework of activities includes certain aspects of regulation such as plan review and evaluation for construction permits, inspection and surveillance of existing facilities connected to the system,

but not under the direct operating control of the management entity, and monitoring for the purpose of enforcement. These activities would probably be located under the general heading "operation." In addition, data collection and research are legitimate activities and would also be a part of any management agency.

Another essential function may be called performance assessment. This activity provides the means for one entity to assess the performance of another with respect to how well or how poorly it is meeting certain specified administrative criteria. The major difficulty here is the lack of agreed upon indicators of environmental quality.

6. The MSB of the Twin Cities is indicative of an areawide arrangement in which the service area of the operating entity is different from that of the parent body, the Metropolitan Council. Their service area is defined as that area that has attained or will attain by a specified date on "urban population density." It should be noted that the MSB does have authority to operate in the area outside its service area under certain conditions.

7. Metropolitan Sewer Act, Minnesota Statutes 1969, Chap. 473C, at Sec. 5.

8. Thomas D. McKewen, "Regional Management of Waste Systems," Journal of the Water Pollution Control Federation, 44, (No. 8), August, 1972, pp. 1493-1497.

9. Ibid.

10. John M. Armstrong, "State Environmental Utilities for Waste Management," Journal of the Water Pollution Control Federation, 44, (No. 9), September, 1972, ____; See also State of Vermont: Land Use and Development, Vermont's Environmental Programs -- A Guide. (Montpelier, Vermont, Agency for Environmental Conservation), September, 1972.

SECTION VII

ANALYSIS OF LEGAL PROBLEMS OF IMPLEMENTING INSTITUTIONAL MODELS FOR WATER QUALITY MANAGEMENT

The three suggested institutional models -- areawide, basinwide, and regionalized state -- are generally larger geographically and functionally more comprehensive than existing local waste treatment management agencies. The models place many functions in one agency, including those required by §208(c)(2), which are currently being performed by several agencies having jurisdiction in the area being served. For example, treatment may be performed at the local level (city, municipality, sanitary district, etc.); planning may be on an areawide, or at least a larger area, basis; standards may be set on a statewide basis; enforcement may be a combination of local and state agencies or just state agencies. The purpose of the institutional models is to integrate these functions, or most of them, in one agency resulting in a more comprehensive, efficient and responsible approach to water quality management.

Different models are suggested since water quality problems differ from state to state. Equally important are the differences in political climate within the states and the degree to which local governments exercise autonomy in water quality control.

In analyzing the models in the light of existing state laws and the requirements §208(c)(2), it is important to identify the important functions to be performed in order to attain and maintain an effective system of water quality management, or, as it is referred to in the Act, waste treatment management. Stated in broad categories, these functions include (1) planning, (2) design and construction, (3) operation and maintenance of physical facilities and the administration of non-structural measures, (4) standard-setting, for both effluent limitation and water (stream) quality, (5) regulation and issuance of permits, (6) enforcement, and (7) research and training. It is immediately recognizable that on a functional basis, many different agencies at different levels of government within each state are currently performing these functions. All of these functions are included in each institutional model. It is also recognizable on a funcitonal basis that the requirements of §208(c)(2) fall principally within the functions of design and construction, operation and maintenance, and enforcement.

While it is unwise to generalize, it can be stated with assurance that in most states, the larger the geographical area of the institutional model and the more numerous the functions

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included in that model, the more prevalent and more difficult are the legal problems and the more heightened is political resistance. It can also be stated that to the extent that more power is required "at the top" to implement the institutional model, more legal problems are created and, certainly, more political problems, are encountered, mainly in the difficulty of convincing local units of government to relinquish their existing powers. These difficulties arise because the functions of planning (site selection, size and type of treatment works, and area to be served) and operations are controlled by local levels. These problems are not to be lightly dismissed however, since local control and lack of cooperation have resulted in inefficiencies, waste of resources, and, most importantly, degradation of the nation's waters. As noted previously, a major purpose of the Act is promotion and requirement of an areawide approach to water quality management to overcome these problems. The institutional models suggested respond to this purpose of the Act.

AREAWIDE MODEL

The fewest legal and political problems are encountered with the areawide model. Most states permit local political subdivisions to join together to form a sanitary district or other entity for the purpose of wastewater management. This is generally accomplished on a voluntary basis as authorized by interlocal cooperation acts or similar state legislation. The key to this approach is, of course, the incentives for voluntary cooperation and agreement. These incentives include savings to taxpayers, better overall water quality, and availability of federal grants to assist in planning and construction. Under the voluntary approach, a problem arises if local governments refuse to cooperate and thus defeat the purpose of the §208 areawide plan. Many states do not authorize forcing a unit of local government, otherwise in compliance, to join an areawide plan. Provided a unit of local government can "go it alone" to comply with standards of treatment, little can be done to require that unit to cooperate with other units of local government which cannot "go it alone." The withholding of federal funds and the permit system are two methods of coercing a recalcitrant unit of local government, but it is in this area that enabling legislation is needed in many states if the areawide institutional model is adopted.

Other functions such as standard-setting, regulation (permits) and enforcement can be handled on an areawide basis. If these are currently being accomplished by a state-level agency, authority could be delegated to the areawide agency under conditions such that state level or statewide minimum standards are met as set forth in the state §303 plan. The areawide agency could, therefore, perform these functions constrained only by standards imposed by the state. It should, of course, be remembered that the standards of pretreatment and effluent limitations imposed by EPA as provided by §§306 and 307 of the Act must be met. But, if these functions are being performed at local levels, the agreement establishing the areawide agency can provide for performance of these functions by the areawide agency.

The areawide agency's powers with respect to raising funds -- i.e., incurring long- and short-term indebtedness -- is another problem area that deserves mention. Since existing facilities may still be under a bonded indebtedness, provision will have to be made for the new areawide agency assuming this existing indebtedness. In the case of revenue bond financing, problems may exist because the revenues of a particular project are usually pledged to retire the indebtedness. In the case of new indebtedness, fewer problems are encountered, since the state interlocal cooperation acts usually provide a power to incur indebtedness on the part of the areawide agency. Absent such provisions, remedial legislation may be necessary to enable the new entity to issue bonds and establish the procedures for the issuance, including approval by the electorate of the area.

One point stressed in each of the institutional models is local representation in the area of policy making. It is suggested that elected officials participate in policy making decisions. This could present legal problems in some states, particularly if the positions are salaried. Some states do not permit elected or appointed officials to serve in more than one governmental salaried position, and, in some fewer states, to serve in more than one position whether salaried or not. In such situations, enabling legislation should be drafted to overcome this problem.

In summary, the areawide model whose political boundaries follow those of the constituent political subdivisions composing it has the fewest legal problems of the proposed models. In most states, such an areawide model can be set up by voluntary, interlocal agreements authorized by state law.

Problems may be encountered if one or more units of local government refuse to cooperate, since the power to require cooperation may be lacking. With respect to this problem, enabling legislation is therefore likely to be needed. This power to require all governmental entities within the area to join and abide by the §208 areawide plan is very important, if not essential to accomplishing the purposes of the Act. For example, §201(c) provides that "to the extent practicable, waste treatment management shall be on an areawide basis and provide control or treatment of all point and nonpoint sources of pollution," §208(b)(1) requires that the areawide planning process be consistent with §201 and further that such areawide plan establish a regulatory program to implement §201(c) and to regulate the location, modification, and construction of any facilities within the area which may result in any discharge in the area.

The areawide plan is particularly adaptable to the planning and operations functions. Legal constraints (or lack of authority) to perform other functions such as standard-setting, regulation and enforcement, and functions required by §208(c)(2) can be overcome by the delegation of the powers to the areawide agency.

BASINWIDE MODEL

Basinwide models generally will encompass a much larger geographical area than the areawide model. The larger geographic area will tend to increase the legal problems and most certainly increase the political problems. The political problems occur because of the likelihood that a more diverse populace will be encompassed in a basinwide area than in the areawide model which is based on an urban-industrial concentration.

The comments with respect to the areawide model are applicable to the basinwide model -- i.e., voluntary interlocal cooperation agreements are available in most states, while "enforced" cooperation is not readily available. However, an additional problem arises since the area encompassed by the basinwide model may not follow existing boundaries of constituent political subdivisions. In some states, it is not legally possible to cut across boundaries of existing political subdivisions to create a new entity such as a basinwide agency. In others it is not possible without approval of the electorate of the affected subdivisions.

Under the basinwide approach, the basin stream and its tributaries can more readily be classified by the basinwide agency according to the streams' uses. Thus the water quality standards for the classification of the basin streams may place more stringent limitations on the discharge into the streams compared with effluent limitation standards. This occurs when application of the effluent limitation standards will not result in meeting the water quality standards of the recipient stream. The legal and policy problems presented are that the same industries discharging the same pollutants, but into different streams, will be treated differently, so that one must meet the more stringent standards imposed by the water quality standards, and the other is only required to meet the effluent limitation standards. However, if the stream classifications and water quality standards are reasonable, there would appear to be no insurmountable legal problem in enforcing them.

An advantage of the basinwide approach is that regulation and enforcement can be coordinated for the entire basin instead of having it determined by each urban-industrial complex in the basin watershed. This requires, however, more extensive regulatory and enforcement mechanisms than now exist in many states, particularly in states where such functions are performed wholly or in part at the local level.

In summary, the basinwide institutional model presents the same problems as the areawide model, with the addition that the problems may be larger in scope and thus more difficult to resolve. It also presents some additional problems arising from the fact that existing political subdivision boundaries may not be followed. Too, the implementation of the basinwide model creates possibilities of claims by dischargers of unequal treatment although this could also occur in an areawide model in which two or more streams are involved.

REGIONALIZED STATE MODEL

The regionalized state institutional model provides for the state being the prime motivator. The state agency would divide the state into manageable regions with each regional agency being a branch of the state agency. Instead of providing coordination among, and services to, regional (areawide) agencies, the state would actually direct them. In other words, this concept provides for governing "from the top down." Maryland and Puerto Rico are examples of the statewide approach, although they are not as extensive as the institutional model.

The utilization of voluntary interlocal cooperation agreements would not be feasible. The state would need authority (1) to require its political subdivisions to act, or (2) to take over the functions of water quality management, including planning and operations, thereby eliminating local levels of government from these functions of water quality control. In small or sparsely settled states, or in states with political subdivisions incapable of effective action, the statewide regional plan would be appropriate, but the loss of autonomy by local units of government would certainly militate against this type of plan in many states. It is difficult to envision many state legislatures being able to muster enough support to enact the required legislation.

As noted before, the larger the area included in the management plan, the more legal problems encountered. This is particularly true of the regionalized state model. While many states provide for state level planning, standard setting, regulation and enforcement, very few provide for operation, financing, or establishment of charge systems at the state level. These functions have therefore been performed at the local level. If the regionalized state model is to succeed, there must be adequate assurance of local input into policy making and decisions affecting the public. Therefore, any legislation enacted to implement the regionalized state model should stress local representation with the power to make decisions on local issues.

In summary, only a few states have gone so far as to provide for a statewide regional concept of managing most functions of water quality control. Such functions as standard setting, regulation and enforcement have been performed by state level agencies, but general planning and operations have not been. New legislation would be required in nearly all states, and due to the fear of loss of autonomy and control at the local level, its passage appears somewhat remote.

SUMMARY

A plan to include all or most functions of water quality control in one areawide or larger agency will encounter legal obstacles in many states. The functions of planning and operations have customarily been exercised at a local level, and a shift toward a centralized agency was not envisioned when many state water quality control laws were enacted. Most states do provide, however, for voluntary cooperation among political subdivisions, but very few states provide authority to require such cooperation. Cooperation may be induced or coerced by economic incentives, stringent regulation, or by operation of the permit system, but generally cooperation cannot be required. The model that can be implemented voluntarily and cooperatively among political subdivisions of the state appears to have the most application. The alternative to this voluntary approach is the enactment of legislation by which a state can require compliance by local subdivisions; such legislation should provide local subdivisions with the opportunity to join together voluntarily after notice from the state before compliance is mandated.

SECTION VIII

REGULATORY MECHANISMS: A PERSPECTIVE

INTRODUCTION

§208(b)(2)(C) of the Act sets forth some of the regulatory attributes required of the planning process by waste treatment agencies qualifying for federal funding. The section specifies that §208 plans shall include, but not be limited to;

> (c) The establishment of a regulatory program to -
>
> (i) implement the waste treatment management requirements of §201(c) (To the extent practicable, waste treatment management shall be on an areawide basis and provice control or treatment of all point and nonpoint sources of pollution, including in-place or accumulated pollution sources,)
>
> (ii) regulate the location, modification, and construction of any facilities within such area which may result in any discharge in such area, and
>
> (iii) assure that any industrial or commercial wastes discharged into any treatment works in such area meet applicable pretreatment requirements.

There is no definition in the Act of the term "facilities" as it appears in §208(b)(2)(C)(ii). In various parts of the Act "facility" is used to refer to 1) publicly owned research facilities for the "prevention, removal, reduction and elimination of pollution on lakes, including the undesirable effects of nutrients and vegetation" [§104(h)(B)]; 2) revenue producing instrumentalities providing for recycling of potential sewage pollutants, confined and contained disposal of pollutants, reclamation of wastewater, and ultimate disposal of sludge [§201(d)]; and 3) facilities for sewage treatment and recycling, in order to treat, dispose of, or utilize other municipal and industrial wastes [§201(e)].

The use of the term in the text of the Conference Committee Report on the Act suggests that "facility" be interpreted as any publicly-owned, stationary waste treatment works. On the other hand, a different interpretation is indicated when the phrase "facilities. . .which may result in any discharge. . ." is analyzed. In §502(16) 'discharge' is defined as "a discharge of a pollutant, and a discharge of pollutants." §502(12) defines 'discharge of a pollutant' as "(A) any addition of any pollutant to navigable waters from any point source, (b) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft." Therefore, it is reasonable to interpret facility as used in Title II as including point source dischargers -- both public and private -- into navigable waters. It appears that, given this interpretation, the areawide agency must be allowed to utilize land use controls as well as the more traditional forms of regulation. In this report suggestions will be made concerning implementation of land use controls based on the broader definition of facility.

Compliance with §208(b)(2)(C) can largely be achieved through the use of existing regulatory devices and expansion or modification of these devices. An example is the Metropolitan Council of the Twin Cities Area, an areawide agency which provides control and/or treatment of point and nonpoint sources of pollution through permits and waste discharge regulations. Location, modification and construction of facilities is regulated through river zoning, building codes, sewage regulations, and permits. Pretreatment requirements are fulfilled through sewage and waste control regulations. As this example suggests, in most cases several regulatory techniques are used independently or in combination to achieve an enforcement goal. Although the techniques discussed in this report are dealt with in separate sections, it should be kept in mind that frequently two or more of these techniques may be used simultaneously to complement each other. In addition, one mechanism may be particularly adaptable to a problem area. For example, land use controls in older, more established cities may not be as effective as a permit system. In newly developing areas, however, land use controls may be the most effective.

Clearly, the intent of the Act is to stimulate new and more effective systems of regulation on an areawide basis; hence, a positive attitude toward consideration and implementation of new methods of regulation is demanded of the areawide planner. Furthermore, the creative administrator should be able to broadly interpret existing enabling legislation, giving special attention to definitions and meanings of terms. It is the intent of this section to suggest alternative regulatory mechanisms in the hope that more efficient and effective means of implementing §208 may be developed.

In the sections that follow, five regulatory mechanisms are discussed: 1) land use controls, 2) permits, 3) standards, 4) pricing mechanisms, and 5) a category of miscellaneous methods. Where possible, potential expansion of these devices will be pointed out, especially for nonpoint sources. The rationale underlying the order of presentation of the schemes is a movement from the most direct controls to the least direct.

LAND USE CONTROLS

The most direct means of regulating point and nonpoint sources of water pollution on an areawide basis is through land use controls. The spectrum of land use control ranges from outright prohibitions of certain uses within a given area to uses being permitted under certain conditions. With respect to treatment management agencies participating in land use planning and control, a review of the statutes and literature indicates that such agencies' statutory capacity for zoning occurs only in isolated instances.

Environmental considerations have not as yet had much impact on land use planning. Yannacone and Cohen point out that "recent advances in environmental science make it possible to base land use regulation on ecological considerations. While it has long been recognized that planned growth is of greater benefit to society than unplanned growth, the planning process has traditionally lacked significant input from the environmental sciences"[1].

Enabling acts for zoning codes (many of which were framed in the 1920's) rarely include provisions for water quality considerations mentioning only that zoning should facilitate adequate water and sewerage supplies. Although not expressly stated, water quality control might be included as a criterion for zoning decisions based on the broad purpose sections of most enabling acts -- i.e., of "public health and welfare". A modern zoning code, more amenable to considerations of water quality, was suggested by the Maryland Planning and Zoning Commission Law Study in 1970. In the purpose sections it states: "Every local government shall have power to regulate land use and development for the present and future health, safety and general welfare of its citizens. The powers granted herein shall be exercised with forethought and reasonable restraint so that the measures adopted will promote the economic prosperity of this State, secure continued improvement in the living conditions for all segments of the population and offer the maximum encouragement to private initiative for the accomplishment of these goals"[2]. Such environmental considerations are presently reflected in the Maryland statutes on planning and zoning which include as legitimate purposes of planning "conservation of natural resources, [and] the prevention of environmental pollution"[3].

Zoning has historically been the domain of local governments. Recently, however, some states have moved toward state level control. Vermont now requires land use permits[4], Maine has enacted development and land control legislation[5], and Hawaii has instituted statewide zoning to control general development. "Pursuant to a state plan, land in Hawaii is classified for use into conservation, agricultural, rural and urban districts by the State Land Use Commission. The state determines what uses will be allowed in conservation and agricultural uses. The counties. . .can issue special permits in agricultural areas but they are subject to state veto. . .It is only in urban areas that the local governments have primary control of zoning"[6].

In specialized instances, water management agencies serving areas with flooding problems are granted zoning authority. An illustration can be found in the Delaware River Basin Compact, where the Delaware River Basin Commission is empowered "to adopt amend and repeal recommended standards, in the manner provided by this section, relating to the nature and extent of the uses of land in areas subject to flooding by the Delaware River and its tributaries. Such standards shall not be deemed to impair or restrict the power of the signatory parties or their political subdivisios to adopt zoning and other land use regulations not inconsistent therewith"[7]. The capability established by this type of ordinance could be a valuable tool in regulating unrestrained development on many flood plains throughout the United States.

Recent years have seen the advent of "shoreland" zoning. Michigan and Wisconsin are two examples. In Michigan, the water resources commission is enabled to conduct studies determining which areas of Michigan's shoreland are to be considered "high risk". A high risk area is defined as an area "of the shoreland which is determined. . .to be subject to erosion." These areas can be controlled by zoning ordinances implemented by counties, cities or townships, subject to approval by the water resources commission. In addition, the commission prepares a shoreland management plan which provides, among other things, "for the prevention of shoreland littering, blight harbor development, and pollution"[8]. In Wisconsin, the Department of Natural Resources must have a comprehensive plan as a guide for municipal ordinances regulating navigable waters and their shorelands for the preventive control of water pollution[9]. Counties are specifically authorized to enact zoning ordinances relating to unincorporated lands within 1000 feet of a lake, pond or flowage or within 300 feet of a river or stream. If the County ordinance does not meet the minimum standards of the state Department, the Department must adopt such an ordinance for the county[10].

Another potential means of regulating land use is the establishment of preventive measures to control soil erosion, sedimentation and runoff. Traditionally, soil conservation districts have had the primary role in this area; however, in some states this role is limited to providing guidelines and recommendations with no enforcement powers other than education, persuasion and withholding financial and technical assistance[11]. In Wisconsin, on the other hand, these districts may formulate and the counties may adopt land use regulations for unincorporated land; after the regulations are approved by the electorate of the district, they are valid and enforceable by the courts. Activities which may be regulated include engineering operations, cultivation methods, cropping programs, land retirement and exposing of land by grading, filling, and clearing[12]. In its Model State Act for Soil Erosion and Sediment Control, the Council of State Governments has proposed similar powers for these districts, but without the limitation of electorate approval[13].

The role of an areawide agency in this area could be direct or indirect. The agency might replace the conservation district as the regulatory body or it might have final approval authority regarding regulations established by the district. In some instances such a direct role for the agency may be undesirable or politically not feasible[14] and the areawide agency might be limited to an indirect role. For example, the agency might be directed by statute to assist districts in formulating regulations.

Indirect control over land use may be effected by the operating agency through its power to control the rate and size of sewer extensions to unserved areas. The strategy of restraining undesired development through phase extension of interceptor sewers has been implemented in the Metro system of Minneapolis-St. Paul, where the policy has been to:

> Phase interceptor extensions to promote orderly and economic growth.
>
> Extend interceptors into communities only when the residents are assured of governmental

> capability to provide a full range of urban services and to exercise adequate planning and development control.
>
> Prohibit extension of sewer systems into areas where development should not occur. . .[15]

A lesson can be learned from the unfortunate results of an effort to control development near Chicago through restriction of interceptor extension size. The Northern Illinois Planning Commission hoped to limit and control development through the use of a small extension into an unserviced area. The Metropolitan Sanitary District of Greater Chicago responded that this was economically unsound and that an extension of twice the size would be needed to satisfy the projected population of the area. The Metropolitan Sanitary District reasoning was sound, and the planning commission had no legal authority to inhibit population influx by use of a smaller pipe. The conclusion can be drawn that a regulatory scheme is only as effective as the ability to carry it out.

Although the power of zoning is not explicitly in the enabling legislation of the most waste treatment management agencies, the possibility of influencing the zoning process should not be overlooked. Formal or informal participation with the agency(s) responsible for planning zoning policy allows the waste treatment management agency to provide input to the decisions surrounding land use; this occurs through both access to and review of proposed zoning policy, and generation of alternative policy. This will be more easily accomplished in those agencies who are closely related to planning bodies within the intergovernmental structure. For example, the Metro Council of Minneapolis-St. Paul contains both the water management agency and the land use planning agency within the same organizational structure, affording the capacity for continuing interaction and coordination.

Land use, and hence categories of water use, is clearly affected by other factors such as the transportation modes available to the area. For this reason, the agency should seek active participation in the planning processes surrounding extension of transportation services (especially the location of roads) into undeveloped areas. In situations like these, agencies with managerial or financial responsibility or interactions with transportation activities, such as the Metro Council of Seattle, will have less trouble achieving coordination. In the same vein, areawide agencies should also seek to contribute information to land use decisions concerning expansion, extension or establishment of utility services, schools and shopping centers.

Another means of attaining direct control is through public ownership, or placing restrictions on private land in a development. Use of this technique is found in Ontario where "5 percent of any total subdivision area (subdivision of land is under the jurisdiction of the Ministry of Planning and Development) is assigned to the local municipality for park purposes; and, in conformance with the policy of maintaining open water courses, 50 ft. strips on each side of streams frequently are dedicated and placed in public ownership"[16]. Although this "assignment" system is not customarily used in the United States, the majority of the agencies reviewed are equipped with legislation permitting purchase and ownership of land within their service areas.

It should be noted that in some instances such zoning regulations might be challenged as being an unconstitutional taking of land without compensation[17]. Factors which would be relevant in a particular case include (1) whether the enabling legislation establishes sufficient authority for the ordinance[18]; (2) whether some feasible uses of the land in question are permitted; (3) whether the restrictions imposed in a particular case bear a sufficient relation to the purposes sought to be achieved by the ordinance[19]; and (4) the amount of deferrence to legislative decision-making given by the respective state courts[20].

In summary, water quality control can be greatly affected by land use planning, but such planning has not been within the powers of those agencies primarily concerned with water quality control. Therefore, the agencies concerned with water quality control should either be given land use control power -- which is highly unlikely -- or these agencies should be given other devices which can influence land use which affects water quality. Examples of such devices include participation in the land use planning process, authority over special or critical areas such as shorelands and flood plains, authority to require dedication of land to prevent pollution and soil conservation district controls.

PERMITS AND LICENSES

One of the most widely used forms of water pollution control is the issuance of permits. Beginning on the federal level with the 1899 Refuse Act, the practice of issuing permits to control discharges has resulted in a myriad of permit types. For the purpose of this discussion, permits are defined as those written warrants granted by an authority giving the receiver freedom to engage in a specific activity. Licensing, on the other hand, is used to refer to warrants granted to individuals, including individuals involved in maintenance, monitoring, engineering and planning.

Title IV of the Act (Permits and Licenses) requires that both public and private discharges of pollutants must have a permit. The permit system may be implemented by the state or the Administrator of EPA, but if implemented by the state the permit system must be approved by the Administrator. Permit systems are not, however, limited to those activities resulting in discharges into streams and public waters since they also encompasses pretreatment. A state or waste treatment management agency can, if it has the authority, establish a permit system as a means of control. Since it would be a violation to engage in a discharge activity without a permit, the enforcement agency has only to prove that a suspected violator is discharging waste without a proper permit. More important than controlling non-permit-holders is the power to regulate the discharge activities of permit holders through stipulations: 1) setting criteria for siting, design and construction as well as performance capability, 2) regulating quality and quantity of effluents discharged, 3) requiring monitoring and inspection facilities of private users, and 4) requiring pretreatment facilities and specifying pretreatment standards for users of the treatment system that will enable the regulating agency to achieve desired stream standards.

Permit programs can be subdivided into four types based on the kind of regulation they are intended to achieve: 1) "hook-up" permits are those permits intended to regulate the quantity and quality of effluent discharged into a public sewer system; their purpose is to regulate the quantity and quality of waste entering a public treatment facility so that the facility can achieve a degree of treatment resulting in an effluent compatible with areawide water quality standards, 2) permits regulating point sources of pollution are issued to public or private treatment facilities which discharge directly into area waters; the intent of these permits is to regulate the quantity and quality of effluent in order to achieve desired stream standards, 3) permits regulating nonpoint sources of pollution are issued to regulate activities or the use of materials that can result in nonpoint pollution problems such as the indiscriminant use of fertilizers, insecticides, herbicides, construction, etc., 4) permits of the aforementioned types incorporating modifications of standards as a function of geographic location; permits with this added condition can be an effective means of influencing land use activity in accord with an areawide plan.

Hook-up permits have been extensively used to regulate the materials and engineering standards of sewer and sewer related construction of systems hooking into public treatment works.

As an example, the Metropolitan Sanitary District of Greater Chicago requires permits for the construction of sewer hookups serving residential building and industries, and the construction of local government and industrial treatment works. This permit system allows MSDGC to review the permit application, with attention focused on "minimum engineering standards governing the design, construction and maintenance of sewers and sewage systems. . .including requirements as to types of materials, methods of installation, maximum permissable rates in infiltration and other engineering parameters"[21]. Furthermore, inspection manholes are required for all commercial and industrial buildings in order that MSDGC technicians may inspect and monitor permittee discharges.

No construction permits for sewer construction within any municipality lying totally or partially within a flood plain will be issued unless the municipality has a Flood Plain Ordinance that the MSDGC has approved.

Control over privately owned sewers or sewage collection systems that discharge into a public treatment system or discharge directly into area streams may be achieved through the implementation of an operating permit plan. A statutory model mandating such a plan can be found in "Proposals of the MSDGC for the Amendment of Certain Rules and Regulations. . . of the Illinois Stream Pollution Control Board Rules and Regulations": "No person who owns and operates an interconnected system of sanitary sewers and/or combined sewers consisting of more than one mile of pipe that does not discharge to a unit of local government shall cause or allow the use or operation of its part of the system of sewers. . .without an Operating Permit issued by the Agency. . ."[22]. This plan enables the administering agency to regulate engineering and operating parameters of non-public systems. The duration of this type of permit may be either permanent or, as in the case of MSDGC, of a limited period "in order to facilitate basin planning, to coordinate Operating Permits with future deadlines, and to maintain intensive control over new or experimental processes"[23].

A third type of permit system regulating discharge into a public system is the industrial waste discharge permit system. Metro Seattle requires an industrial waste discharge permit of "each person discharging or proposing to discharge industrial waste into a public sewer, private sewer or side sewer tributary to the Metro System"[24]. This plan achieves control over both the quantity and quality of flow received by Metro treatment works. The ordinance establishing the plan specifies: "Any person making or proposing to make a change in an existing Industrial Waste Discharge which does or will substantially change the volume of flow or characteristics of the waste or establish a new point of discharge shall apply for and secure an Industrial Waste Discharge Permit"[25]. Additional responsibilities of permit holders are: 1) pretreatment facilities, if so required, at holder's expense; 2) waste analysis reports and sampling manholes, if required; 3) inspection by Metro personnel, if so required[26]. This type of permit has obvious potential as a tool for instituting the pretreatment requirement of §208(b)(2)(C)(ii) of the Act.

Regulation of point sources through a permit system is achieved by requiring permitees discharging into waterways to submit plans and specifications of proposed construction; to report of discharge activity: to provide access for the purpose of monitoring discharge, and to maintain an effluent commensurate with appropriate water quality standards. In many instances the legislation that enables an agency to regulate discharges into public treatment facilities through permits also enables the agency to regulate privately operated treatment facilities through the same permit system. The MSDGC's "Sewer Permit Ordinance" contains language that permits the MSDGC to regulate private treatment facilities' effluent[27].

Feedlot operation constitutes a point source of water pollution that is a major water quality problem in many agricultural areas. Some legislation has been enacted that suggests that feedlot operations can be effectively regulated through a permit system. Nebraska's Rules and Regulations pertaining to livestock waste control requires the operator of a proposed or existing livestock operation to apply for a permit. When livestock waste control facilities are required they must be designed by the U. S. Department of Agriculture, the Soil Conservation service, a registered professional engineer, or other qualified person in order to prevent discharge of objectionable runoff according to the Nebraska law. Feedlot permits in Nebraska further stipulate that the permit can be revoked or suspended if 1) Nebraska Water Quality Standards are violated, 2) livestock wastes are permitted to enter adjoining property, or 3) if relevant facts are misinterpreted or withheld[28]. Legislation in Iowa empowers the Water Quality Commission of the Department of Environmental Quality with the right to deny permits for the installation or operation of a poultry or livestock operation that does or may cause pollution[29]. The Council of State Governments has also suggested a model state act for confined animal feeding environmental control[30].

Although some examples of legislation aimed at regulating nonpoint sources of water pollution are at hand, a great deal more legislation and enforcement is required to achieve adequate control of nonpoint pollution emanating from mining activities, agricultural activities, logging, construction, and storm water runoff.

Stream pollution resulting from pesticide and herbicide uses in agriculture is gaining recognition as a problem that will require increased regulation. Presently, most states have laws requiring registration of pesticide and herbicide materials and in some cases the registration (licensing) of commercial appliers is required. While use of pesticides and herbicides will undoubtedly continue, tighter regulation of their use is required. Regulation of the amount and type of pesticide/herbicide used in an area could be achieved by requiring permits for pesticide use limiting the amount and types of pesticides/herbicides as a function of water quality control. The role of an areawide agency in achieving such a permit system would probably be one of encouraging the appropriate state agency (Agriculture) to adopt such a system. As an example, in New York pesticides must be registered annually with the Commissioner of Environmental Conservation [31]. Additionally, permits must be obtained from the Commissioner for the commercial sale, purchase and custom application of pesticides designated by the Commissioner as "restricted use pesticides"[32]. The Commissioner may also issue rules and regulations regarding the use of pesticides, and these rules and regulations shall encompass all reasonable factors which the Commissioner deems necessary to prevent damage or injury to health, property and wildlife[33].

Fertilizers leached from fields also constitute a nonpoint stream pollution problem that requires additional attention on the part of water quality management agencies. Traditionally the cost-benefit decisions concerning fertilizer use have been made solely by the individual farmers using fertilizers, but with the increased knowledge of the impact that fertilizer use has on streams it becomes increasingly obvious that the costs of fertilizer use are also a public concern. Regulation of fertilizer use can be achieved through a permit system stipulating amounts, kinds, and conditions of fertilizer applications. Again, the role of an areawide agency in achieving such a system will probably be one of encouraging the appropriate agency (Agriculture) to adopt such a system. Iowa has legislation which permits the state Department of Environmental Quality to adopt rules relating to the distribution and use of agricultural chemicals such as pesticides and fertilizers[34]. Violation of such rules constitutes a misdemeanor[35].

A permit system to regulate nonpoint pollution emanating from mining activities are now being strengthened in many states and promise to be an effective means of regulating these pollution sources. Abandonment of the notion that mineral resource exploitation and clean water are mutually exclusive concepts must occur before effective controls on mining activities can be attained. Several states have recognized the interrelatedness of water quality and mining practices and have adopted legislation regulating mining activities through issuance of permits and licenses. Two examples are Ohio and Pennsylvania. "Ohio now requires that when active mines are abandoned, they must be sealed so as to minimize sedimentation and mine drainage. Pennsylvania has a substantially tougher law and a more active regulatory program. Since 1965 Pennsylvania has subjected mine operations to a permit requirement. State approval of a plan of wastewater disposal is now a condition to mining operations. State authorities now inspect each active mine twice a year. Both Ohio and Pennsylvania have cracked down on strip mining. In both states strip miners are required to obtain a license and post a surety bond to guarantee performance of their statutory duties to restore mined areas. Pennsylvania seems to apply its requirements more rigorously and has inspected 700 strip mine sites to check for acid drainage"[36].

Implementation and consideration of measures to regulate construction related runoff are just getting under way in some states. The National Water Commission's "Legal Study 18"[37] notes legislation in Maryland which would require soil conservation district approval before earth moving can begin and Iowa's soil conservation law specifically requiring erosion control practices at construction sites including residential units and roadways. Suggested legislation prepared by the Council of State Governments includes construction activities among "land disturbing activities which should be controlled to prevent sedimentation and pollution"[38].

A permit-like system has been employed by the Metro of Minneapolis-St. Paul to regulate pollution eminating from septic systems within the expanding urban area[39]. Generally county or local boards of health have exercised the septic tank permit authority.

The utility of a permit system is not limited to simply regulating specific point and nonpoint sources of pollution, and imposing pretreatment standards on users of public sewage systems. An areawide agency may selectively restrain undesirable development (industrial or residential) by setting higher permit standards where development would have deleterious effects on area waterways. This does not imply that arbitrary standards are to be set or that the standards which are set as stipulations of permits reflect true costs of the activities regulated by the permit.

Prior to the implementation of a permit system a water pollution control agency must assess its means and abilities to implement a permit system that will result in the water quality standards desired. This must include assessment of an agency's capability to deal effectively with the problems generated by a permit system and the water quality desired. The National Water Commission's "Legal Study 18" presents the following comprehensive list of problems encountered in achieving optimum water quality and protection through a permit system:

> . . .difficulties drafting the enabling legislation broad enough to reach all significant existing and potential waste dischargers, fixing the impact point of the permit (at what points are controls exerted over the discharger's activity), identifying in the field dischargers covered by the law, establishing fair and workable procedures for the issuance of permits, determining the policy to be applied in establishing permit conditions (are the conditions to be based on receiving water standards or some uniform formula for wastes removal), obtaining adequate information about water quality and waste characteristics, evaluating and applying scientific and technical information concerning water quality criteria and waste treatment processes, deciding for how long the permit is to be valid and how it should be revoked or modified, determining whether a fee is to be charged for issuance of a permit and, if so, on what basis to establish the fee, assuring competent treatment of plant operation through programs for operator training and certification, providing adequate program follow-through (reporting, monitoring, inspections, stream surveillance, etc.), and enforcing violation of permits by prompt and effective measures[40].

In summary, any desired degree of water quality control in an area of given size and development implies the size of qualified staff as well as amount and kind of field and laboratory hardware necessary to maintain the desired effluent control level. In establishing the degree of control, that can be attained or setting a goal for additional control an agency must have or be able to acquire staff to review permit applications meaningfully, this of course, implies engineers capable of reading and interpreting engineering drawings of the permittee's facilities, as well as a clerical staff to handle receiving, filing, and billing of permit applications. Once issued a permit requires periodic monitoring by the regulatory agency in order to insure compliance with the stipulations. The effectiveness of permit enforcement is governed by the frequency of sampling, the type of sampling that is conducted, and the ability to enter and obtain samples randomly. The size and professional skill of the sampling staff and the sophistication of the sampling techniques selected are critical factors in the successful operation of a permit system. An agency capable of gathering and analyzing a permittee's effluent will be able to achieve the greatest degree of effluent regulation.

As the above discussion indicates, skilled personnel are critical to the successful operation of a permit system or any other regulatory system. In a recent editorial in the Journal of Water Pollution Control, this point was emphasized: "The operator problem, stated in its broadest sense, is the need to develop a well-trained cadre of skilled talent capable of controlling the sophisticated processes that are becoming integral parts of modern treatment plants"[41]. The author goes on to note that in addition to higher wages commensurate with the level of skill expected a system of operator certification is necessary. From the evidence obtained in this study, operator certification need not be limited to personnel of the areawide agency and, when pretreatment requirements are a requirement for a permit, certification of the operator of these facilities should also be required.

STANDARDS

For the purposes of this report the two-part definition of "standards" found in the 1965 Federal Water Quality Act is used: (1) the establishment of water quality criteria applicable to interstate waters or portions thereof within the states, and (2) the adoption of a plan for implementation and enforcement of such criteria[42]. "Criteria may be defined as the upper limits on concentrations of given wastes or on water temperature within a watercourse. Three types of water standards (water quality standards), are of concern here: (1) ambient or stream standards, which focus on waters receiving discharges; (2) effluent standards, with the focus on discharges into receiving waters; (3) pretreatment standards, with the focus on wastewater discharged into public treatment works. Theoretically, standards perform three vital functions. First, standards serve as objective measuring sticks, replacing the vague concept of pollution with quantifiable parameters. Secondly, standards act as convenient baselines for determining eligibility for a permit. Finally, water quality improvement can be translated into quantifiable terms by using past and present standards as baselines for measuring improvement.

Considerable controversy has been generated concerning the efficacy of stream versus effluent standards. Prior to the Act much of the federal effort was directed toward implementation of stream standards. However, incorporated in the Act are provisions for federally promulgated effluent standards. This approach is designed to aid state and local enforcement efforts, as stream standards have been shown to be poor devices for initiating enforcement proceedings. The problem arises in the difficulty of establishing the culpability of dischargers surrounding a watercourse where stream standards have been violated. The effluent standards, once promulgated, will alleviate this problem by establishing waste load limits at the point of discharge. This approach has resulted in a strategy where the states are required to submit to the EPA a list classifying all segments of rivers as "effluent limited" or "water quality limited." "An effluent guidelines limited segment would meet water quality standards after application of best practicable control technology for industry and secondary treatment for municipal plants. All other segments are water quality limited"[43]. Effluent limitation standards are varied according to classifications of industrial users, but even within a user category uniformity of standards is not necessary if the quality of the receiving water so requires. Although it appears that EPA is attempting to achieve in-stream quality through effluent regulation, both ambient and effluent standards must still be met.

The ability to formulate water quality standards is often found in the enabling legislation of wastewater management agencies, from regional to less than areawide. Wording typical of such legislation is found in the Delaware River Basin Compact; "the commission may adopt and from time to time amend and repeal rules, regulations and standards to control such future pollution and abate existing pollution. . .as may be required to protect the public health or to preserve the waters of the basin for uses in accordance with the comprehensive plan"[44]. It should be noted that "while the state can and should set maximum allowable limits, local communities and their inhabitants have an inherent right to determine the type of environment they want to live in. This right includes the right to adopt and enforce more stringent standards"[45].

The pretreatment standards required by §208(b)(2)(C)(iii) can be achieved either directly or indirectly. Direct control is the product of legislation enabling the operating agency to require users to provide pretreatment facilities and/or to meet a standard of wastewater entering the treatment plant. The following is used to illustrate such legislation, but it is apparent that the clause could be used to enforce compliance with ambient or effluent standards as well:

> It shall be unlawful for any person to cause or allow to be discharged sewage or wastes of any kind into any waters, or sewerage system under the jurisdiction of the Sanitary District which does not conform to the criteria or water quality standards established and adopted by the Sanitary District ansd as set forth in. . .this Ordinance[46].

In formulating such legislation, care should be taken to include provisions permitting the agency access to private discharge flows:

> In order to ascertain whether or not the sewage system conforms to the criteria or water quality standards of the District, the District may use any appropriate method or device which will lead to such a determination. . .
>
> Each person covered by this Ordinance shall provide on the premises in his possession, a so-called control-manhole or any other device or facility suitable and appropriate to enable the Sanitary District to conduct gauging and sampling operations to determine conformance with the criteria and water quality standards of the District. Representatives of the District shall have the right during reasonable hours to enter upon the premises of each such person for the purpose of setting up measurement or sampling devices or facilities, or of inspecting or examining them, or of conducting necessary or desirable measuring, gauging and sampling operations[47].

Occasional violations of pretreatment standards can be regulated through "accidental discharge" clauses, such as that found in the Sewage and Waste Control Rules and Regulations for the Metropolitan Disposal system of Minneapolis-St. Paul:" Accidental discharges of prohibited waste into the metropolitan disposal system, directly or through another disposal system, or to any place from which such waste may enter the metropolitan disposal system, shall be reported to the Chief Administrator by the person responsible for the discharge, or by the owner or occupant of the premises where the discharge occurs, promptly upon obtaining knowledge of the fact of such discharge"[48]. As may be deduced from this clause, standards serve as efficient means of totally prohibiting the discharge of substances determined by the agency as deleterious to the successful operation of the treatment facility, hence achieving compliance by the facility with regional effluent standards.

Pretreatment standards may be effected indirectly through stipulations of discharge permits. Legal precedent demands, however, that these standards must be uniformly applicable within categories of users, i.e., the permit issuance must be based on fair and evenly applicable standards.

Standards for nonpoint sources of pollution can also be established. As an example, construction related run-off could be made subject to standards. The term "construction standards" embraces a wide range of standards aimed specifically at regulating the run-off, sewage, refuse, etc., resulting directly from construction projects. This type of standard can be a viable technique of fulfilling the requirement of control of nonpoint sources in §201(c). It has the advantage of being available to agencies of small jurisdiction, such as the town, village or township. Considered in this category are building codes, which represent criteria for operation and maintenance of buildings.

Standards regulating construction methods and materials may also be achieved directly through ordinances governing the design characteristics and materials of construction, or indirectly, through permits. One example of the former can be found in the Delaware River Basin Compact, where the DRBC is empowered to: "Establish standards of planning, design and operation of all projects and facilities in the basin which affect its water resources. . ."[49]. Standards work to effectively complement permits. The sewer permit system of the Metropolitan Sanitary District of Greater Chicago outlines specific engineering and construction criteria which must be met before an applicant is eligible for a permit. Included among these criteria are requirements for access points and sampling manholes to allow MSDGC to monitor the wastewater of the permittee[50].

One strategy of pretreatment control might be a differential application of standards throughout an area. This tactic might be used by itself, or in conjunction with a permit system, to influence the location of development (industrial or residential) within the agency's geographical jurisdiction. Still another possibility would be the legislative establishment of standards defining criteria of mining, agricultural, and feedlot construction and operation.

The foremost problem in implementation of standards systems is enforcement. In the case of effluent standards, enforcement is dependent on two variables: (1) adequate monitoring and surveillance and (2) effective sanctions. Ambient standard enforcement is a more complex matter. The National Water Commission's "Legal Study 18" lists three fundamentally different approaches to enforcing receiving water standards[51]. First, there is the "abating standards approach." This is simply surveillance followed by agency investigation if standards are violated. The dischargers, when identified, are charged with violations and so notified. If the violation is disputed, a hearing is held before the control agency. Depending upon the outcome of the hearing, the discharger may be fined, jailed, or an injunction may be ordered against further operation of his facility.

The second method is that of effluent charges, which involves government imposition of charges on the discharges of private users, incorporating the heretofore unacknolwedged costs of resource use. (The resource being the assimilative capacity of the stream.) Ideally, charges would be adjusted in such a manner as to induce the discharger to reduce his waste load output to the point where the concentrations are equal (or lower) than the desired standards.

The final alternative for implementing stream standards is coupling ambient and complementary effluent standards. This is what the Act requires. With adequate information gathering capability and sanction power, this combination could achieve water quality standards at costs comparable with the other least-cost method, effluent charges.

In summary, monitoring equipment and personnel are necessary, but the sanctions available to the agency appear to be a more critical tool. Sanctions may include penalties, surcharges and the right to refuse service to those in violation of the standards. These sanctions should be available if an effective standards system is to be carried out.

PRICING MECHANISMS

Various pricing mechanisms can be used (1) to induce minimization of costs associated with waste disposal and (2) to encourage reduction of pollutants discharged into a service region.

One variety of pricing mechanism is that which utilizes payments or subsidies to private waste dischargers to encourage in-plant changes resulting in lower pollutant output. These may take the form of tax write-offs for capital outlays in pollution control devices or as lump-sum payments of such a value as to cover the costs to the discharger of removing a given amount of material from his wastewater. In specific state cases, Wisconsin allows an income tax deduction of the cost of acquisition of abatement facilities[52]. Massachusetts allows property tax exemptions for facilities[53], while Illinois exempts facilities from sales taxes[54].

On the state level, the tax write-off mode is far more popular than the direct subsidy. This is true on the federal level also, where tax incentives are enabled via §169 of the Internal Revenue Code[55]. It appears that legislators feel, probably with some justification, that the American people would rather see private pollution abatement achieved through tax incentives than through monetary payments drawn from public monies.

Although there is some controversy concerning the efficacy of this tax incentive mechanism, most authorities agree that the federal program, as it is currently constituted, is insufficient to achieve the goals of cost minimization and reduced effluent loads. Criticisms frequently leveled at tax incentive systems include: (1) such systems shift the cost of abatement from polluter to the government or consumer[56], (2) they cause resource misallocation, (3) they aid those in lesser need of aid (i.e., they are more favorable to the larger corporations), (4) such systems constrict the tax base and build hidden costs into the tax system[57]. Additionally, these systems have been characterized as overemphasizing abatement "hardware" at the expense of alternative methods of improving water quality such as in-plant changes in production process on materials. The consensus seems to be that to make the federal program work, incentives (write-offs, subsidies, etc.) should be extended to operations and maintenance as well as initial capital investment. Such a program would clearly involve a much larger expenditure than the current program.

The most widely practiced pricing mechanisms are variations on the "charge" theme. One theoretical form is the full cost recovery user charge (effluent charge). According to one author, "effluent charges strive to 'internalize' the cost of water use, that is, to cause a cost for water use to be included in production as the legitimate resource cost that it is, so that this cost will play a role in all decision-making involving the use of water"[58]. For several reasons the effluent charge is not used extensively in the United States. This type of charge demands a sophistication in both implementation and administration not found in many waste treatment management agencies. A large initial capital investment is necessary to finance studies necessary to establish allocation of costs to dischargers, as well as monitoring hardware to insure that correct charges were being levied against the user. On philosophical grounds, the effluent charge has been labeled a "license to pollute" -- i.e., that it is a tacit acknowledgement of the discharger's right to dispose of undesirable materials in public waterways. Proponents of the effluent charge counter that the charge, if correctly implemented, creates a dynamic system in which dischargers are truly motivated to install and maintain pollution reducing equipment (especially when coupled with stringent water quality standards).

Much more common is the "user" or "sewer" charge. The user charge is differentiated from the full cost recovery user charge on the grounds that the latter purportedly reflects all externalities involved in water use, while the former represents only the costs associated with operation and maintenance of treatment facilities. There are several methods for assessing user charges. The flat rate method "allocates waste treatment costs among all users on the basis of some unit, such as a percentage of the water bill, numbers of employees, a block-rate schedule related to water intake or some combination of these"[59]. In the second method "a basic sewer charge related to volume is levied on all users of the waste treatment system"[60]. A third type of charge is the surcharge. In this case, discharges above a certain volume or strength are tabulated and billed to the user in addition to the normal user charge. User charges may also be constructed to include other characteristics of the waste discharged into the system such as BOD, toxicity, suspended solids and delivery flow rate.

Most municipal user charges are of the flat rate type and are directed toward the end mentioned above: absorption of operation and maintenance costs. This method has the deficiency of offering no incentive to reduce volume of consumption. However, it has been repeatedly shown that assessing charges individually on a volume-per-user basis does act as an incentive for large private users to evaluate their operation and possibly reduce both the volume used and the strength of wastes discharged. Surcharges also have the advantage of providing a fair and equitable base for proportionally allocating treatment costs.

Aside from the virtue of obtaining additional revenue for an agency, the surcharge serves as a viable alternative to (1) increasing treatment plant capacities in areas of high industrial usage or development, or (2) reducing incoming waste strength through pretreatment requirements.

As noted in Section IV of this report, §204(b)(1) requires that the system of charges assure that each recipient of waste treatment services will pay its proportionate share of treatment costs. Thus, the flat rate or volume methods of charging will not, most likely, comply with the act.

Due to the necessity of maintaining discharge monitoring (either permanent or periodic), pricing mechanisms are not amenable to control of nonpoint sources of pollution unless, as in the case of feedlot runoff, the amount and quality of the wasteload of the discharge(s) can be quantified. In summary, charges are a potentially powerful method of controlling point discharges and, in the case of user charges, available to the smallest agency. Although there may be legal constraints, adjustment of charge rates to reflect the extent of development desired within various sections of the service area should be considered as a feasible method of controlling the location of facilities as required in §208(b)(2)(C)(ii).

Implementation of charge systems, of course, involves enabling legislation. One example can be found in the Sewage and Waste Control Regulations for the Metropolitan Disposal System of Minneapolis-St. Paul:

> No statement contained in this article shall be construed as preventing any special agreement or arrangement between the Sewer Board and any discharger whereby a waste of unusual strength or character may be accepted into the Metropolitan disposal system for treatment, subject to payment therefor, by the discharger[61].

A perhaps more comprehensive clause is illustrated by the Delaware River Basin Compact:

> The commission may from time to time after public notice and hearing fix, alter and revise rates, rentals, charges and tolls and classifications thereof, for the use of facilities which it may own or operate and for products and services rendered thereby, without regulation or control by any office, department or agency of any signatory party[62].

Implementation also requires personnel and equipment. Generally speaking, to administer a charge system, the agency needs:

1. A professional staff (sanitary engineers, chemists, and possibly economists) capable of assessing costs of treatment, allocating costs to users, and further adjusting costs in order to influence the location and concentration of users according to the areawide plan.

2. A clerical staff to carry out billing procedures.

3. Adequate sampling, monitoring, and metering equipment with qualified personnel to operate the same.

MISCELLANEOUS REGULATORY MECHANISMS

The more direct systems of regulations available to an areawide agency have been detailed in preceeding sections. In this section we will briefly comment on some additional means of regulation which can be employed by an agency to attain its goal of areawide abatement of water pollution.

Government purchases account for a considerable segment of the economy and are made after specific criteria governing acceptable quality and cost have been satisfied. A component of government consideration prior to purchasing should be the potential effects on water pollution of the item to be purchased. In this regard, the appropriate areawide agency should seek the power of reviewing proposed government purchases and make recommendations based on water quality criteria. An excellent example of government purchasing power affecting practices can be seen in the practice of requiring contractors to state that they do not practice discrimination in employment, etc. A similar stipulation regarding non-pollution might be employed by government purchasers.

Various forms of persuasion can be implemented by an areawide agency to attain water quality goals. The effectiveness of the Delaware River Basin Commission rests, in a large sense, in persuading dischargers to comply with standards, regulations, and local allocations[63]. The DRBC, like most agencies, would rather win compliance through persuasion and voluntary compliance than through the invocation of stringent legal sanctions. Legal sanctions are the "ace in the hole" brought into play as a last resort when voluntary compliance schedules and threats of legal action or hearings have failed to elicit compliance. Persuasion may often be the only tool available to an agency when it attempts to deal with the often nebulous causes of nonpoint pollution. Frequently, a water pollution control agency does not have legal power necessary to implement the needed control. N. William Hines describes an excellent example of the necessity of exercising regulation through persuasion in the case of soil erosion control as well as the need for supplemental legislation:

> Today, there are 3,000 soil conservation districts. However, only eight of these districts currently exercise regulatory powers over land use. Typically, soil conservation districts have relied wholly on voluntary adoption of conservation practices by individual farmers. Federal cost sharing for conservation improvements provides the major incentive for assumption of individual responsibility to carry out an erosion-control project, and federal assistance is conditioned on acceptance of an approved soil conservation program. Enforcement of promised conservation practices in soil conservation districts has traditionally been accomplished through a policy of friendly persuasion. While the voluntary approach to erosion control has achieved significant gains, the pool of landowners who can be induced to act by offers of financial and technical assistance may now be about exhausted. If soil erosion is to be brought under control in this century, the need to adopt mandatory erosion control measures seems clear[64].

A great deal of the regulatory effectiveness of an areawide agency is attributable to its use of publicity and its public image. Effective use of public education and publicity create an image of "credibility." An agency that can sell itself as a fair and effective regulator and manager will have less difficulty in performing its various regulatory functions.

A creative and effective management of an areawide agency should have an eye for publicizing the advantages of and need for water quality control. Public displays, printed materials, letters to newspapers, and a speakers bureau serving fraternal organizations, community action groups, schools, etc., are avenues for informing the public of areawide plans, pollution problems, and the activities of the agency. Educating the public through the various forms of publicity not only helps to gain support for the agency's activities but also serves as a means of obtaining useful feedback and new ideas that will better enable an areawide agency to plan for the future.

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SECTION IX

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SECTION XI

GLOSSARY

Ability-to-pay Principle - The pricing of goods or services based on family income or other measures of capability rather than on the basis of benefits received.

Adequate Authority - The legal capacity to perform functions required by the legislation.

Ad Valorem Tax - According to value; a tax determined by assessment of goods or property.

Areawide - A region which lends itself both geographically and economically to coherent and coordinated planning and management organization.

Assimilative Capacity - The ability of bodies of water to purify themselves by absorbing waste discharges or diluting such wastes.

Basin - The streams, rivers and tributaries and the total land and surface water area contained in one of the 267 major and minor basins defined by EPA, or other basin units as agreed upon by the State and the Regional Administrator.

Benefit - An increase in any one of the values that people pursue.

Benefits-received Principle - The pricing of goods or services on the basis of benefits received by users; those who use the service pay for the service.

Best Available Technology - A standard of equipment, facilities, techniques and processes required by Section 301 of the Act to be applied by all point sources, other than publicly owned treatment works, by July 1, 1983. [Act]

Best Practicable Waste Treatment Technology - The level of treatment required by Section 201 of the Act to be applied by waste treatment management plans before discharge into receiving waters. It may include reclaiming and recycling of water, and confined disposal of pollutants so they will not migrate to cause pollution of the waters. [Act]

Best Practicable Control Technology - Refers to the standard required by Section 301 of the Act to be applied by all point sources, other than publicly owned treatment works, by July 1, 1977. Factors in determining the best practicable technology include consideration of the total cost of application of

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technology in relation to the effluent reduction benefits to be achieved from such application, as well as taking into account the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process charges, and non-water quality environmental impact. [Act]

Best Practicable Treatment - Refers to the average of the best performers in an industrial category (SIC classification).

Construction - Any one or more of the following: Preliminary planning to determine the feasibility of treatment works, engineering, architectural, legal, fiscal, or economic investigations or studies, surveys, designs, plans, working drawings, specifications, procedures or other necessary actions, erection, building, acquisition, alteration, remodeling, improvement, or extension of treatment works, or the inspection or supervision of any of the foregoing items. The phrase "initiation of construction," as used in this subpart [§212(1)], means the issuance of a notice to proceed, or, if none is required, the execution of a construction contract.

Cost - A decrease in any one of the values that people pursue.

Cost Effectiveness - Comparison of alternative ways to achieve a given objective in order to identify the method resulting in the minimum total resources costs over time.

Discharge of Pollutants - The term 'discharge of pollutant' and the term 'discharge of pollutants' each means (A) any addition of any pollutant to navigable waters from any point source; and (B) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft. [Act, §502(12)]

Ecosystem - A set of clearly recognizable, relatively homogeneous units; all organisms, their natural environment, and the interactions among them.

Effluent Guidelines Limited Segment - A segment of a basin where water quality is meeting and will continue to meet applicable water quality standards or where there is adequate demonstration that water quality will meet applicable water quality standards after the application of the effluent limitations required by the Act. [Proposed EPA Regs., 40 CFR, Part 131]

Effluent Limitation - Any restriction established by a state or the Administrator on quantities, rates, and concentration of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters. [Act, §502(11)]

Excessive Infiltration/Inflow - The quantities of infiltration/inflow which can be economically eliminated from a sewer system by rehabilitation, as determined by a cost-effectiveness analysis that (for the design life of the treatment works) compares correcting the infiltration/inflow conditions with increasing the treatment works capacity to provide the required waste water treatment for the quantities of infiltration/inflow. [40 CFR §35.905-4]

External Diseconomy - A detrimental effect on one or more persons or firms which stems from the activity of other persons or firms; the activity may yield private benefits or advantages to the individuals or firms engaged in it but results in social costs, disadvantages or economic penalties to others. Also referred to as externalities or spillover effects.

Full Cost Recovery User Charge - Any mechanism which levies a price on discharges for the purpose of creating an incentive to affect the quality and/or the quantity of the discharge and, in effect, charge them for utilization of a common property resource.

Industrial Cost Recovery - Recovery by the grantee from the industrial users of a treatment works of the grant amount which is allocable to the treatment of wastes originating from such users. [40 CFR §35.905-17]

Industrial User - Any nongovernmental user of publicly owned treatment works identified in the Standard Industrial Classification Manual, 1972, Office of Management and Budget, as amended and supplemented, under the following divisions:

(a) Division A - Agriculture, Forestry, and Fishing.
(b) Division B - Mining.
(c) Division D - Manufacturing.
(d) Division E - Transportation, Communications, Electric, Gas, and Sanitary Services.
(e) Division I - Services.

A user in the Divisions listed may be excluded if it is determined that it will introduce primarily domestic wastes, or wastes from sanitary conveniences. [40 CFR §35.905-18]

Infiltration - The water entering a sewer system and service connections from the ground, through such means as, but not limited to, defective pipes, pipe joints, connections, or manhole walls. Infiltration does not include, and is distinguished from, inflow. [40 CFR §35.905-5]

Infiltration/Inflow - The total quantity of water from both infiltration and inflow without distinguishing the source. [40 CFR §35.905-7]

Inflow - The water discharged into a sewer system and service connections from such sources as, but not limited to, roof leaders, cellar, yard, and area drains, foundation drains, cooling water discharges, drains from springs and swampy areas, manhole covers, cross connections from storm sewers and combined sewers, catch basins, storm waters, surface run-off, street wash waters, or drainage. Inflow does not include, and is distinguished from, infiltration. [40 CFR §35.905-6]

Marginal Cost Pricing - Charging a price for a good or service equal to the incremental cost of producing the last unit produced. Marginal cost pricing has the attribute of leading to most efficient use of scarce resources. When marginal cost pricing does not prevail, efficiency can be improved by moving resources away from industries where prices are below marginal costs and into industries where prices are above marginal costs.

Municipality - A city, town, borough, county, parish, district (but excluding a school district), association, or other public body (including an intermunicipal agency of two or more of the foregoing entities) created by or pursuant to State law, or an indian tribe or an organization, having jurisdiction over disposal or sewage, industrial wastes, or other wastes, or a designated and approved management agency under Section 208 of the Act. [40 CFR §35.905-9]

Navigable Waters - The waters of the United States, including the territorial seas. [Act, §502(7)]. These include all waters which are navigable in fact as well as those which are capable of affecting interstate commerce.

No Discharge Policy - The policy which prohibits discharge of any pollutant.

Non Point Source - The generalized discharge of waste into a water body which cannot be located as to specific source; any pollutant not identifiable as a point source. Examples are sediment, certain chemicals and drainage.

Non Reimbursable Costs - Those costs in a cost-reimbursement contract which are unallowable and not paid to the contractor out of project revenues. Costs which are not necessary for the construction of a treatment works project are unallowable. Such costs include, but are not limited to:

(a) Basin or areawide planning not directly related to the project;
(b) Bonus payments not legally required for completion of construction in advance of a contractual completion date;

(c) Personal injury compensation or damages arising out of the project, whether determined by adjudication, arbitration, negotiation, or otherwise;
(d) Fines and penalties resulting from violations of, or failure to comply with, Federal, State, or local laws;
(e) Costs outside the scope of the approved project;
(f) Interest on bonds or any other form of indebtedness required to finance the grantee's share of project costs;
(g) Ordinary operating expenses of local government, such as salaries and expenses of a mayor, city council members, or city attorney, except as provided in §35.940-4;
(h) Site acquisition (for example, sewer rights-of-way, sewer treatment plant sites, sanitary landfills and sludge disposal areas), except as otherwise provided in §35.940-3(a). [40 CFR §35.940-2]

Peak Pricing - The technique of pricing goods and services higher at times of peak demand and lower at times of reduced demand; to discourage consumption "on peak" and encourage consumption "off peak," thus to make more efficient use of plant capacity.

Planning Process - The annual strategy of the States for directing resources, establishing priorities, scheduling actions and reporting programs toward achievement of program objectives. The total State planning process is comprised of:

(1) The annual State strategy, which sets the State's major objectives and priorities for preparing basin plans and its annual program plan.
(2) Individual basin plans, which establish specific targets for controlling pollution in individual basins.
(3) The annual program plan (Section 106), which establishes the results expected and the resources committed for the State program each year. The annual plan is developed from the objectives and priorities of the annual State strategy, and, when available, from the specific targets developed in basin plans.
(4) Reports, which measure program performance in achieving programmed results. [40 CFR §130.1]

Point Source - A specific site at which waste water is discharged into a water body and which can be located as to source; any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock;

concentrated animal feeding operation, vessel or other floating craft, from which pollutants are or may be discharged. [Act, §502(14)]

Policy - A procedure for behavior aimed toward achieving certain goals. A guide for action.

Pollutant - The term 'pollutant' means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. This term does not mean (A) 'sewage from vessels' within the meaning of Section 312 of this Act; or (B) water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil or gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if such State determines that such injection or disposal will not result in the degradation of ground or surface water resources. [Act, §502(5)]

Pollution - The term 'pollution' means the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water. [Act, §502(19)]

Problem Shed - A geographic or hydrologic area in which water quality is dependent on a river basin, inland lakes, or a metropolitan water resource area.

Reimbursable Costs - Those allowable costs incurred in the performance of a cost-reimbursement contract which are paid to the contractor to the extent prescribed in the contract. Such allowable costs may include:

(a) Costs of salaries, benefits, and expendable material incurred by the grantee.
(b) Costs under construction contracts.
(c) Professional and consultant services.
(d) Facility planning directly related to the treatment works.
(e) Sewer system evaluation (§35.927).
(f) Project feasibility and engineering reports (§35.920-3(b)(3) and (4)).
(g) Relocation and land acquisition costs required pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 U.S.C. 4621 et seq., 4651 et seq., and regulations issued thereunder, Part 4 of this chapter.
(h) Environmental assessment (§35.920-3(b)(9)), including costs of public notices and hearings.

(i) Preparation of construction drawings, specifications, estimates, and construction contract documents.
(j) Landscaping.
(k) Supervision of construction work.
(l) Removal and relocation or replacement of utilities, for which the grantee is legally obligated.
(m) Materials acquired, consumed, or expended specifically for the project.
(n) A reasonable inventory of laboratory chemicals and supplies necessary to initiate plant operations.
(o) Development and preparation of an operation and maintenance manual.
(p) Project identification signs (§30.604-4 of this chapter). [40 CFR §35.940-1]

Residual - A non-product output whose value is less than the resource cost of utilizing it. The value is time dependent, i.e., it changes with changes in technology and the relative prices of alternative factor inputs. Should a definition such as this be applied to the term residuals as found in §208(b)(2)(J), the alternative available to a creative administrator under the provisions of this Act would be increased.

Separable Costs - Costs which can be isolated and exclusively allocated to a single purpose.

Service Life - The period of time during which a component of a waste treatment management system will be capable of performing a function. [See also 40 CFR §35.905-16]

Significant Industrial User - A user that will contribute greater than 10 percent of the design flow or design pollutant loading of the treatment facility.

Standard Metropolitan Statistical Area - An integrated economic and social unit with a large population nucleus. There are over 245 SMSA's in the United States. Each contains at least one central city with 50,000 inhabitants or more, or two adjoining cities constituting, for economic and social purposes, a single community with combined population of at least 50,000 the smaller of which must have a population of at least 15,000. Each SMSA includes the county in which the central city is located and adjacent counties that are metropolitan in character and economically and socially integrated with county of the central city.

Toxic Pollutant - Those pollutants, or combinations of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring. [Act, §502(13)]

Treatment Works - Any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature to implement Section 201 of the Act, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, outfall sewers, sewage collection systems, pumping, power and other equipment and their appurtenances; extensions, improvements, remodeling, additions and alterations thereof; elements essential to provide a reliable recycled supply such as standby treatment units and clear well facilities; and any works, including site acquisition of the land that will be an integral part of the treatment process or is used for ultimate disposal of residues resulting from such treatment; or any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including storm water run-off, or industrial waste, including waste in combined storm water and sanitary sewer systems.
[Act, §212(2); also 40 CFR §35.905-15]

Useful Life - The period of time during which a component of a waste treatment management system will be required to perform a function which is necessary to the system's operation.

User Charge - A general term that includes all levies associated with water quality management that are born by users of the service; a charge levied on users of treatment works for the cost of operation and maintenance of such works. User charges do not include construction costs. [See 40 CFR §35.905-21]

Water Quality Limited Segment - Any basin segment where it is known that water quality does not meet applicable water quality standards, and is not expected to meet water quality standards even after the application of the effluent limitations required by the Act. [Proposed EPA Regs., 40 CFR, Part 131]

Water Quality Management - Administrative, planning, legal, and operating activities related to a production function of public goods in which water resources are the inputs to the system and goods and services are the outputs. Waste treatment management is one aspect of water quality management.

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